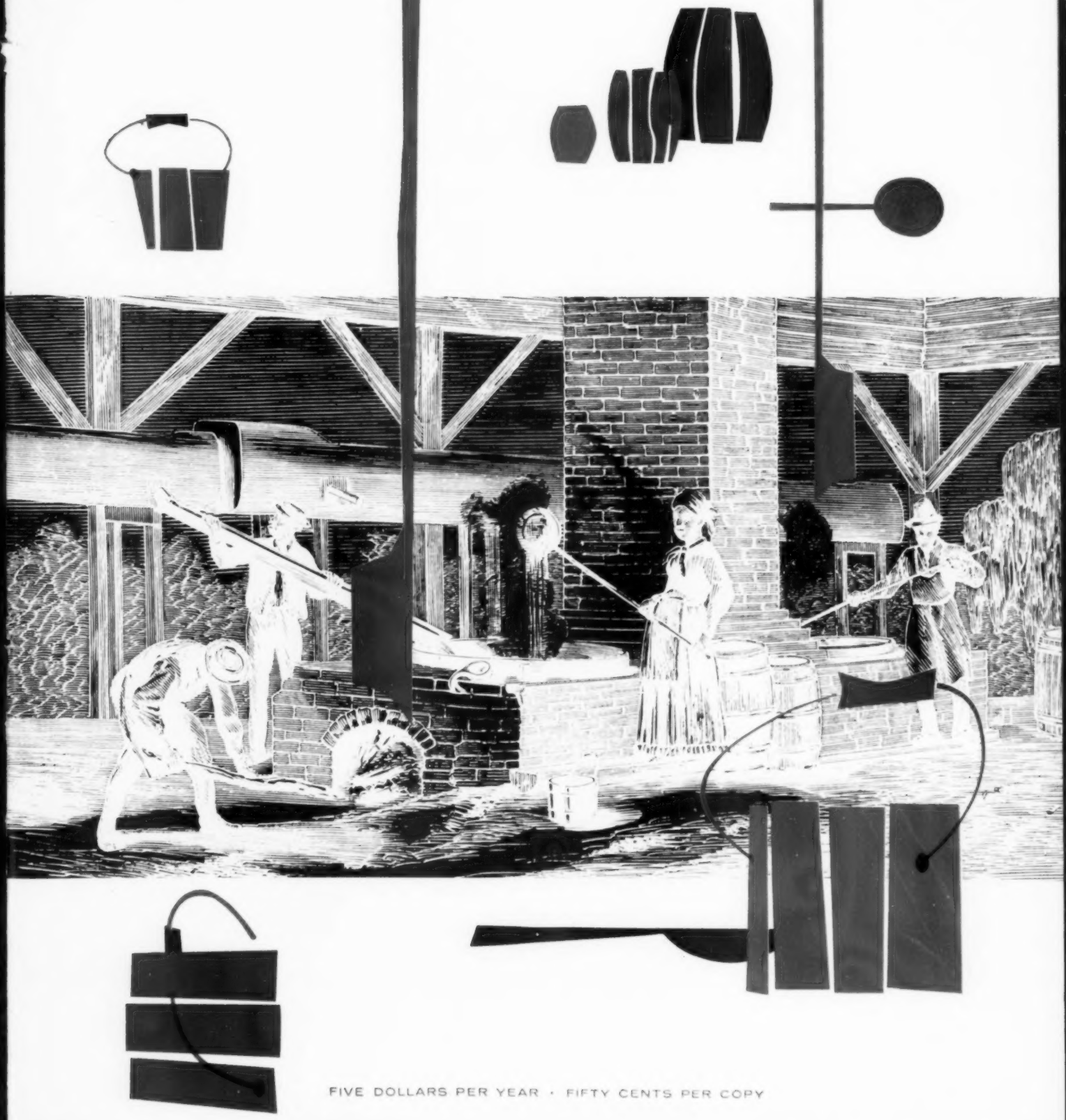
SUGAR y AZUCAR

MARCH, 1958



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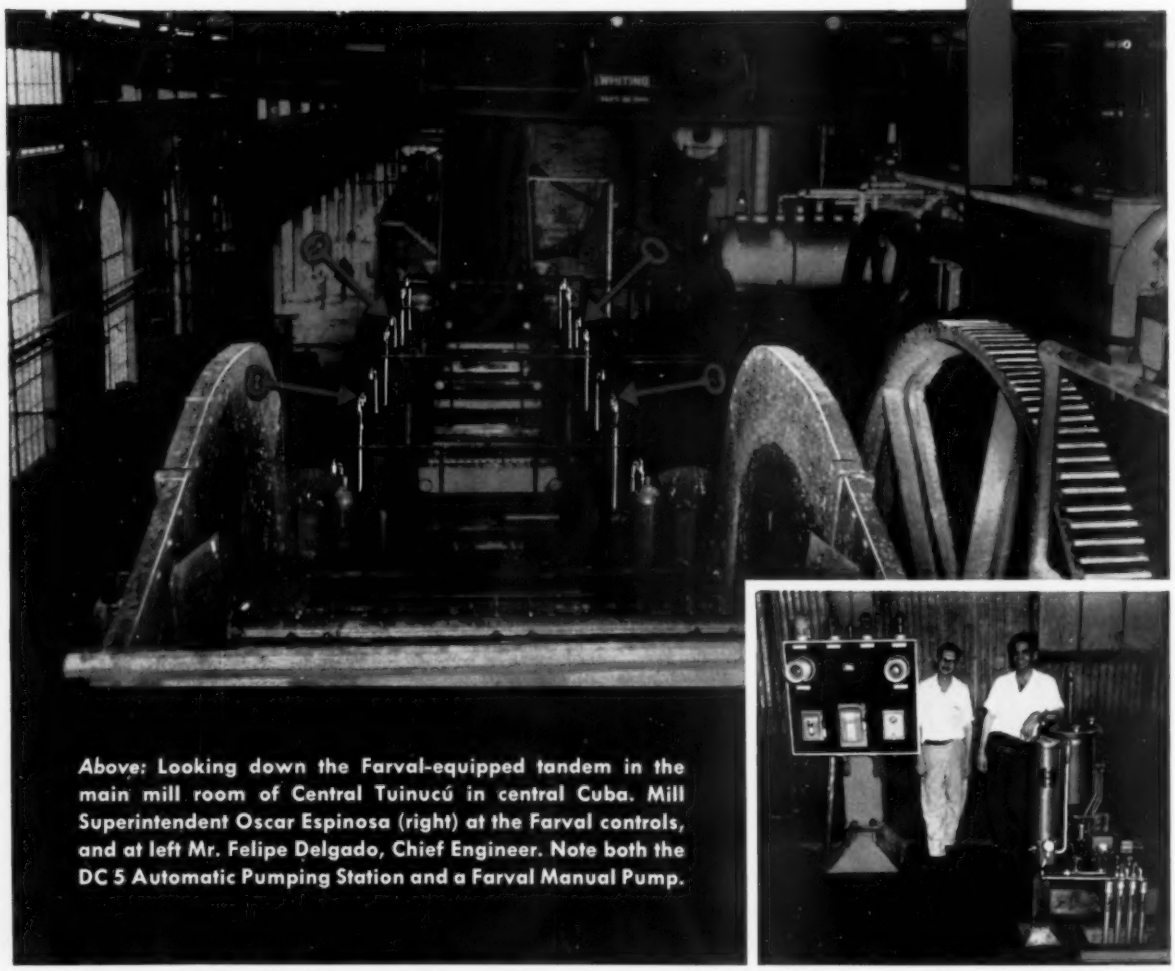
Central Tuinucú lubricates 162 bearings from a single Farval pumping station

FARVAL—
Studies in Centralized Lubrication
No. 209



Above: Looking down the Farval-equipped tandem in the main mill room of Central Tuinucú in central Cuba. Mill Superintendent Oscar Espinosa (right) at the Farval controls, and at left Mr. Felipe Delgado, Chief Engineer. Note both the DC 5 Automatic Pumping Station and a Farval Manual Pump.

● One of the most recent installations in Cuba, this Farval centralized lubrication system at Central Tuinucú is also the largest on the island. It serves 162 bearings on the tandem.

Having completed its first grinding season, the Farval-equipped mill has already paid for itself in four ways:

(1) By saving lubricant formerly wasted;

(2) By saving labor of hand oilers who now do other more profitable work;

(3) By saving the expense of replacing broken, oil starved bearings, ruined by lack of lubrication;

(4) By keeping roll pressures uniformly adjusted, thereby increasing the yield of sucrose from the cane.

Farval can be installed at any time, on an old or a new sugar mill. Get Bulletin 26-S to learn how Farval can earn big savings in your mill, too. The Farval Corporation, 3277 East 80th Street, Cleveland 4, O.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

KEYS TO ADEQUATE LUBRICATION—
When you see the signs of Farval—the familiar central pumping station, dual lubricant lines and valve manifolds—you know a sugar mill is being properly lubricated. Where sugar is big business, there you'll find Farval protecting mill bearings.

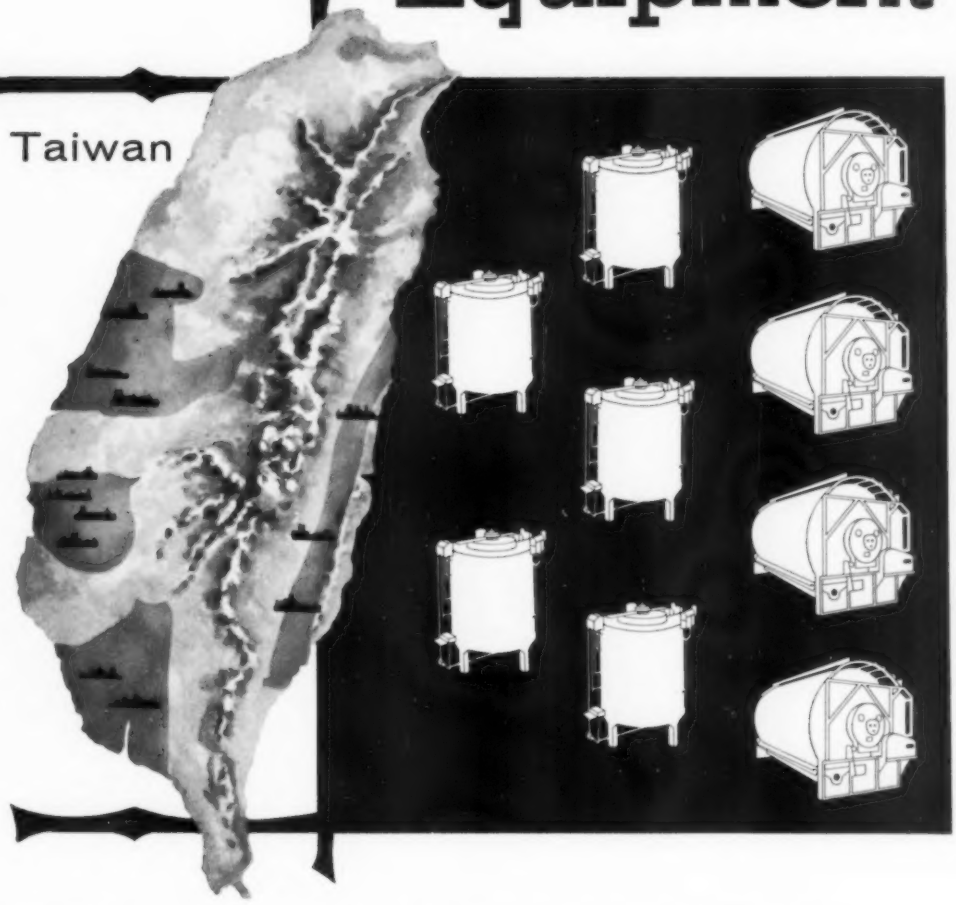
FARVAL
CENTRALIZED SYSTEMS OF LUBRICATION

Taiwan Sugar Corporation Modernizes with

Dorr-Oliver Equipment

Taiwan

台灣糖業股份有限公司



The Taiwan Sugar Corporation, one of the largest producers of sugar in the world, with a yearly output of over ¾ million tons, has recently purchased 5 RapiDorr Clarifiers and 4 Oliver-Campbell Filters as part of their modernization program.

The first Dorr-Oliver equipment was installed in Taiwan over 30 years ago and their continuing reliance on our experience in the fields of clarification and filtration is typical of sugar manufacturers everywhere in the world.

For more information on Dorr-Oliver equipment for the sugar industry write for Bulletins 4092 and 4093. Cane Sugar Division, Dorr-Oliver Incorporated, Stamford, Connecticut, U.S.A.

Oliver-Campbell T.M. Reg. U.S. Pat. Off.

DORR-OLIVER
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SUGAR y AZUCAR

Volume 53, No. 3 March, 1958

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COVER *With steam turbines driving the mills, a degree of automation and instrumentation, with mechanical handling and bulk deliveries, the sugar industry has come a long way from the scene depicted on our front cover. The basic photograph is reprinted through the courtesy of Bettmann Archive and decorated by Charles Kroger with drawings of the vessels and implements used in the days when the scene was current.*

CUBIERTA *Con las transmisiones por turbina a vapor, el empleo de métodos e instrumentos automáticos hasta cierto grado, y el manejo de azúcar a granel por medios mecánicos, la industria azucarera ha adelantado mucho desde la escena ilustrada en la cubierta. Esta fotografía fué reproducida por cortesía de Bettmann Archive y decorada por Charles Kroger con dibujos de los utensilios y recipientes usados en aquella época.*

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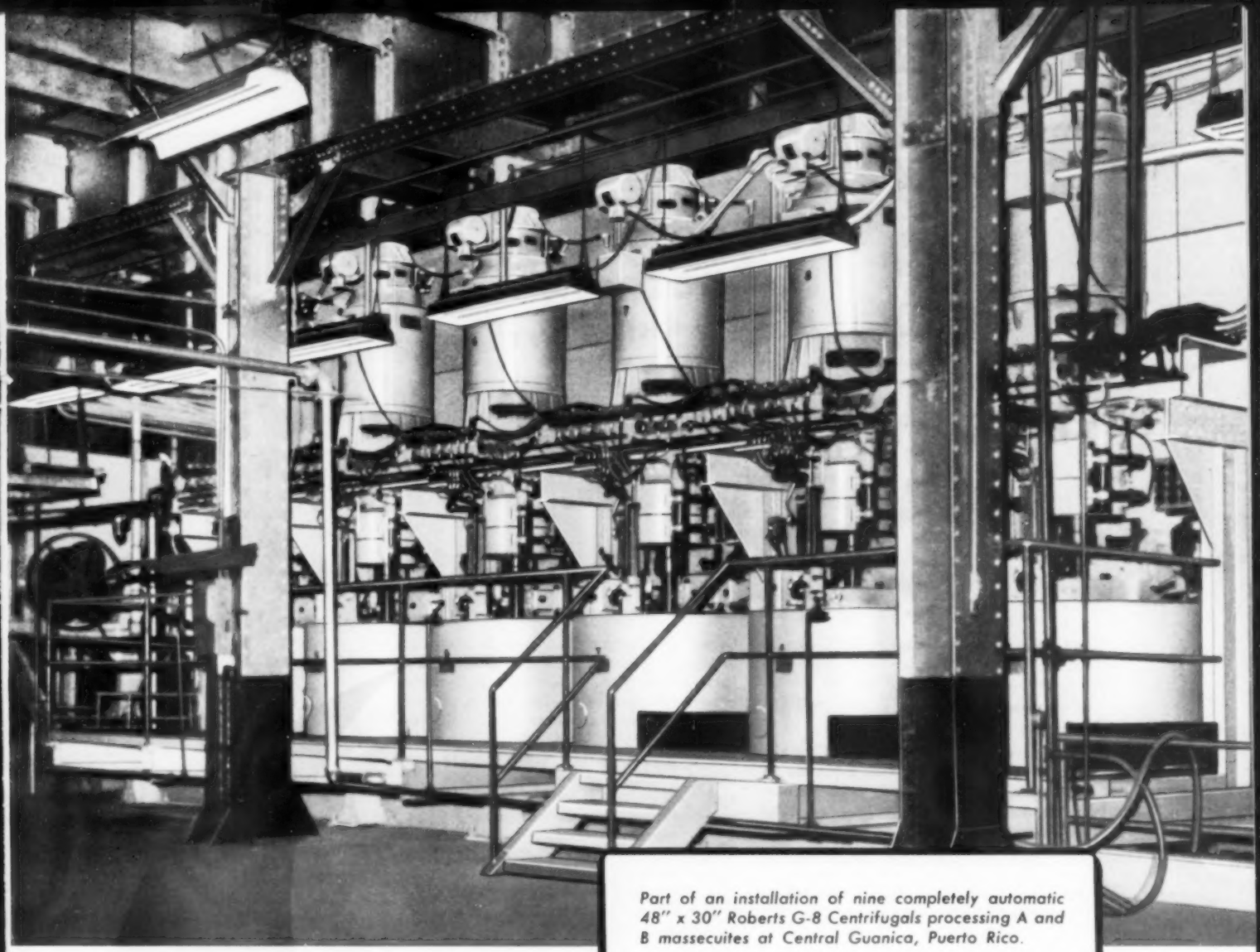

Part of an installation of nine completely automatic 48" x 30" Roberts G-8 Centrifugals processing A and B massecuites at Central Guanica, Puerto Rico.

NINE G-8s at Guanica

The South Porto Rico Sugar Company
operates Central Guanica
the largest raw sugar mill in Puerto Rico.
For centrifuging shipping sugar,
they installed nine
completely automatic 48" x 30" Roberts Centrifugals
for the 1957 crop.
And a powerful testimonial of satisfaction
is a second order
for duplicate machines
for another South Porto Rico Sugar Company property,
which are now being installed for the 1958 campaign.

To keep the lead . . .
we think ahead.

ROBERTS STEVENS
The
WESTERN STATES
MACHINE COMPANY
HAMILTON, OHIO, U.S.A.

2640

it's filtered with CELITE

Cane sugar . . . beet sugar—both can be freed of thermophilic bacteria with efficient, economical Celite* filtration.

If you are refining beet sugar, filter the thick juice or standard liquor.

If you are refining cane sugar, filter the washed sugar liquor. In both cases, as an added precaution, polishing char or carbon liquors will eliminate the possibility of contamination from char filtration.

The result in either case is brilliantly clear liquid sugar that will remain positively pure as long as it is protected from recontamination by spores in the surrounding air.

Celite also gives you important advantages over other diatomites. First, its lower wet density provides greater filter surface coverage . . . six bags do the work of seven bags of other diatomites. Second, you get more consistent results because Celite is more uniform. Each bag is mined and processed at the world's largest and purest commercial diatomite deposit . . . and sped to you direct or through J-M's nationwide warehouse network.

For more information on how Celite filtration helps the sugar industry make better products at less cost, call your nearby Celite engineer or write Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Johns-Manville CELITE
diatomite filter aids

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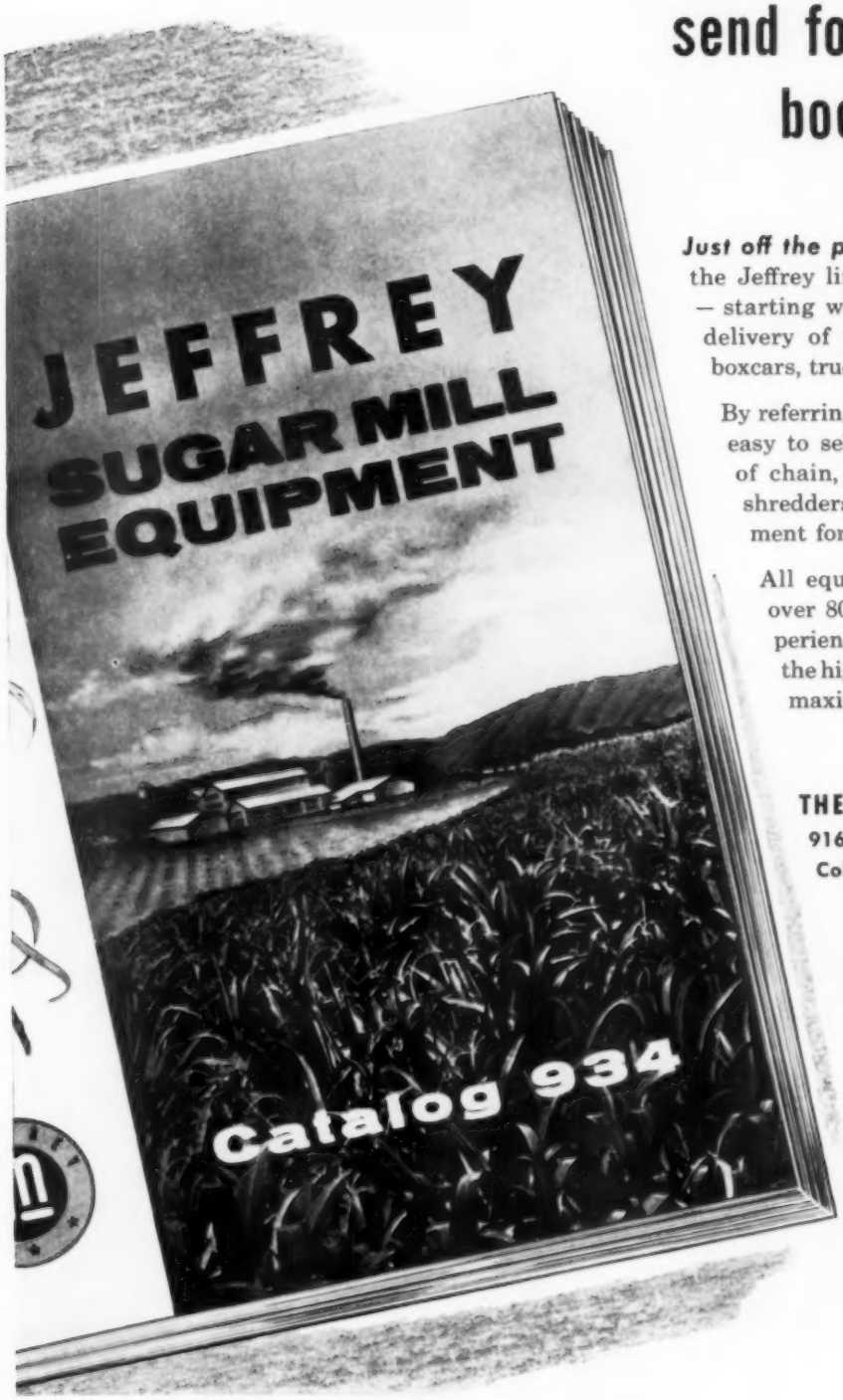


Just off the press, Catalog 934 describes the Jeffrey line of sugar mill equipment — starting with the handling of cane to delivery of raw or finished product to boxcars, trucks and ships.

By referring to this 64-page catalog, it is easy to select and specify proper type of chain, conveyor, elevator, feeders, shredders and other sugar mill equipment for new or replacement service.

All equipment listed is backed by over 80 years of manufacturing experience and "know-how", insuring the highest quality construction and maximum economy in performance.

THE JEFFREY MFG. COMPANY
916 North Fourth Street
Columbus 16, Ohio

JEFFREY

EXPORT DIVISION

Hamill Pans under construction in Glasgow Works

Sole Manufacturers in Britain

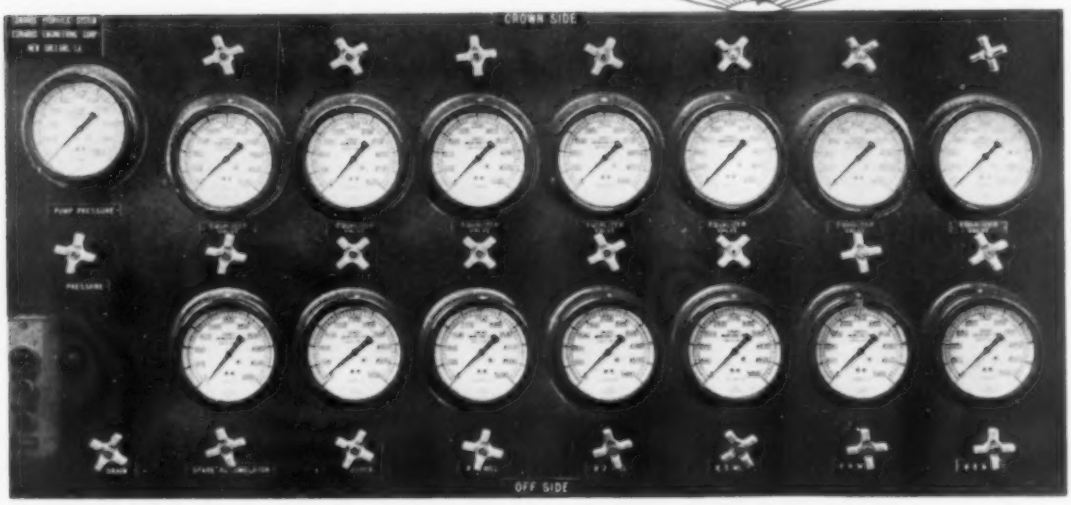
DUNCAN STEWART

Summer Street · Glasgow

& COMPANY LIMITED · GLASGOW

232/D.S.

More than 370 sugar mills in over 35 cane producing areas have installed Edwards Hydraulics.



How Edwards Hydraulic System* gives mills push-button control for more profitable operation

Edwards Central Control panels bring within arm's reach centralized operation of all units in the milling tandem. They assure higher efficiency and speedy manipulation of all hydraulic valves for the entire tandem from one position. In the lower left-hand corner you see the electric button for starting and stopping the Edwards Hydraulic fluid pump with its gauge and valve. Thus, pressure on any mill cap ram can be changed within few minutes.

This rapid and positive control of hydraulic pressure at each mill permits reduction of pressure when cane chokes are imminent and also may avoid breakage of mill parts when tramp iron enters the tandem. The inclusion of the spare accumulator permits substitution for any other accumulator quickly by operating the correct valves.

The top row of valves in the panel controls the hydraulic pressure to the coupling side of the mills, and the lower row of valves controls the pressures on the offside rams. The middle row of valves are for equalizing pressures on both rams of a mill roll.

The panel shown provides for six grinding units in the tandem and by appropriate design can take care of more units when required. The panel also can be extended to include controls for power operated intermediate carrier and other clutches. This rapid clutch control helps to eliminate cane chokes, and also prevents excessive mats of cane entering the mill. For more data on the economy and efficiency of the Edwards Central Control panels, see your nearest representative or write direct.

* U.S. Patent 2,691,339
French Patent 1,020,656
British Patent 678,053
Cuban Patent No. 15,078
Mexican Patent No. 52,402
Patent Pending Other Countries

Hydro-Pneumatic Bladder Type Accumulator Weight 195 lbs. (9 x 56 inches)

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ENGINEERING CORPORATION
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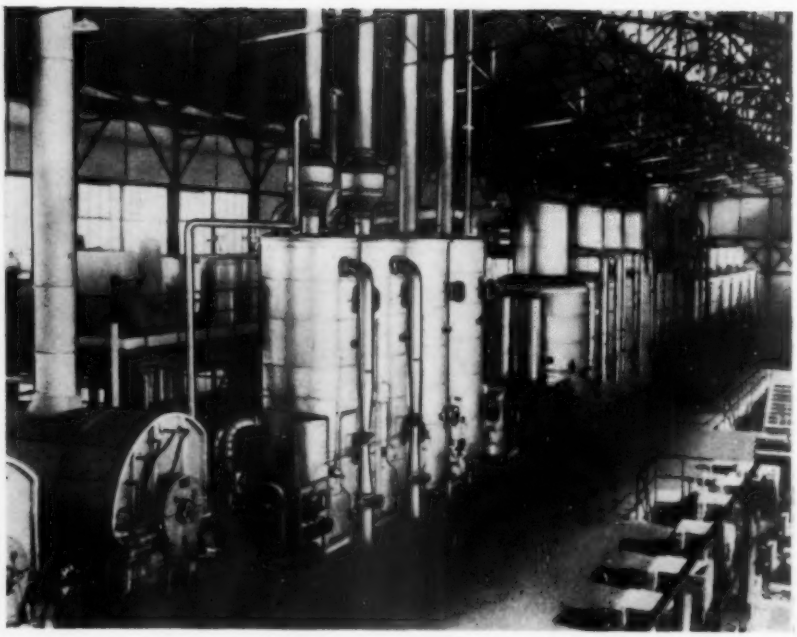
Wherever cane sugar is grown, you'll find Edwards representatives and agents nearby!

18



Inside view of the Malatya Sugar Mill (Turkey)

SUGAR FACTORIES ERECTED THESE LAST 10 YEARS

BEET

	T/day
France	
Artenay	1200
Cagny	800
Corbeilles-du-Gatinais	1200
Origny-Ste-Benoite	900
St-Leu-d'Esserent	1000
Algeria	
Mercier-Lacombe	300
Turkey	
Kayseri	1800
Malatya	1200

CANE

	T/day
Bolivia	
Guabira	1000
Brazil	
Jacarezinho	600
Matosinhos	800
Vassununga	1000
Uruguay	
El Espinillar	1200
Venezuela	
Ureña	700
Madagascar	
Ankaratra	2500
French Congo	
Niari	1150
Belgian Congo	
Uvira	1200
Thaïland	
Supanburi	1500

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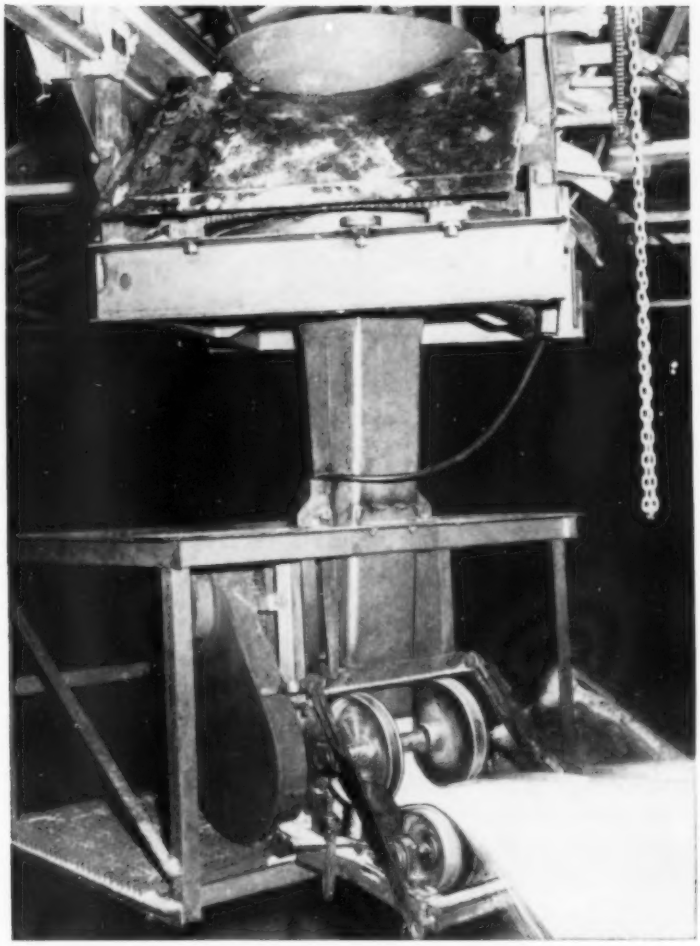
How LINK-BELT Jetslingers and conveyors coordinate

warehousing of 30,000 tons of raw sugar



JETSLINGER piles sugar throughout the vast storage area of this warehouse. Trolley-mounted, under Link-Belt transverse shuttle conveyor, this unit can rotate 360°. It is one of two Jetslingers cutting handling costs at this mill.

70 tons per hour move into storage at Fajardo Sugar Co.

This highly efficient handling system conveys raw sugar from centrifugals to scale hoppers for accurate weighing. It is then conveyed to storage by belt conveyors and to two Link-Belt Jetslingers. Portable belt conveyors are used for loading sugar into trucks. Link-Belt bucket elevators and screw conveyors are also a key part of this Puerto Rican installation.

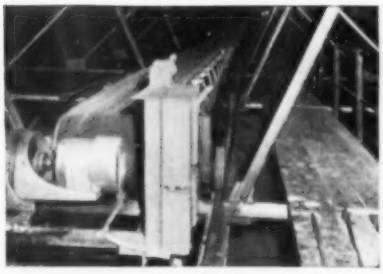
Link-Belt offers a complete line of conveying and power transmission machinery for the sugar industry—designed to assure low per-ton handling costs. If desired, Link-Belt will design, equip and supervise erection of an entire sugar handling system . . . tailored exactly to your space and capacity requirements. For complete details, contact your Link-Belt representative. Or write direct. Address: Dept. 358-SYA.

LINK-BELT

SUGAR HANDLING MACHINERY

LINK-BELT COMPANY: Engineers • Manufacturers • Exporters of Machinery for handling Materials and Transmitting Power • Established 1875. **EXPORT DIVISION:** 2680 Woolworth Bldg., New York 7, U.S.A. Cable Address: Linkbelt—New York • Representatives throughout the World.

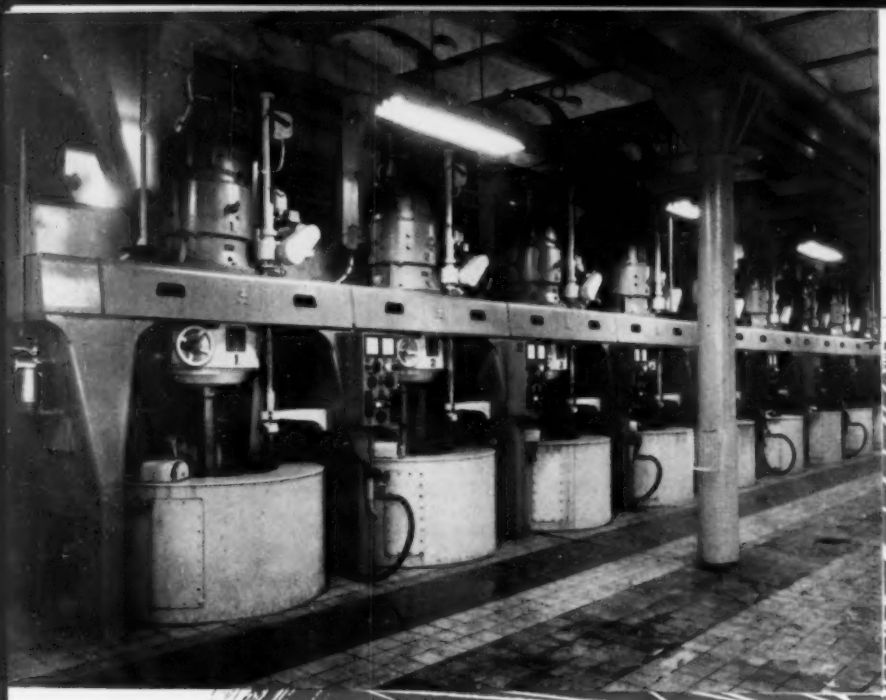
3 TYPES OF LINK-BELT CONVEYORS EMPLOYED AT CENTRAL FAJARDO MILL



REVERSIBLE SHUTTLE CONVEYOR operates in warehouse discharging sugar from either end to Link-Belt Jetslinger.

INCLINED BELT CONVEYORS handle sugar from scale hoppers and onto transfer belt conveyor for delivery to storage.

PORTABLE BELT CONVEYORS used for reclaiming sugar from storage pile for delivery into trucks.



In beet and cane sugar factories and refineries there is always a tendency to modify processing in such a way as to obtain ever greater continuity. To carry this development a stage further, ASEA-Landsverk have brought out

The Fully Automatic Centrifugal

with Leonard Drive

This centrifugal offers the same advantages as the continuously-running, constant-speed machine with reference to low current consumption and low cost of attendance.

Its main features are

Stream-line design
Variable Top and Charging Speeds
Entirely Electric Regenerative Braking
No Current Peaks
Pneumatically Operated Charging Mechanism
Motor-operated Unloader
Centralised Automatic Timing
Suitable for all kinds of Sugar

We are represented and have service facilities in most sugar producing countries.

For further information apply to the nearest ASEA office or direct to

ASEA

Västerås, Sweden

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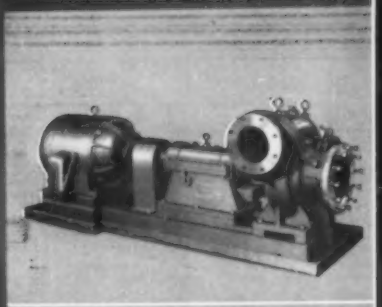
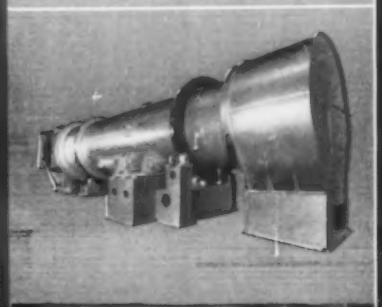
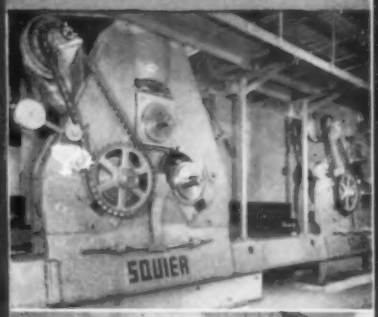
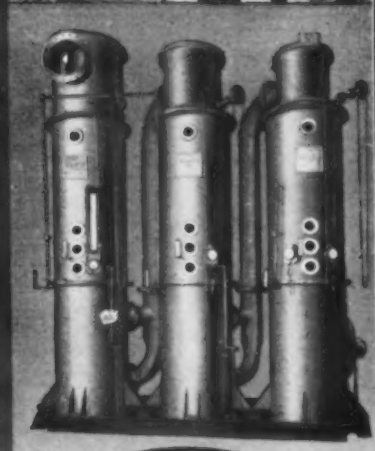
FROM CANE TO SUGAR BAG









"From cane to sugar bag" . . . these five words tell our story. Whether you need a replacement part for your existing equipment, a major modernization program, or a complete new factory, Squier's 101 years of know-how is your assurance of receiving the best in engineering, quality and performance.

THE SQUIER CORP.
ENGINEERS AND MANUFACTURERS
BUFFALO, NEW YORK, U.S.A.

"FROM CANE TO SUGAR BAG" . . . .

SQUIER

FOUR 48" THREE SPEED AUTOMATIC PLOUGHING CENTRIFUGALS

IN MAURITIUS . . .

. . . the LA BARAQUE factory installed in 1955 a battery of five Broadbent centrifugals to cure their 'C' massecuites, and last year the 48" centrifugals illustrated to cure their 'A' and 'B' massecuites.

Two identical batteries will soon be shipped to Mauritius for the UNION FLACQ and ST. AUBIN factories.

THOMAS BROADBENT & SONS LTD. HUDDERSFIELD ENGLAND

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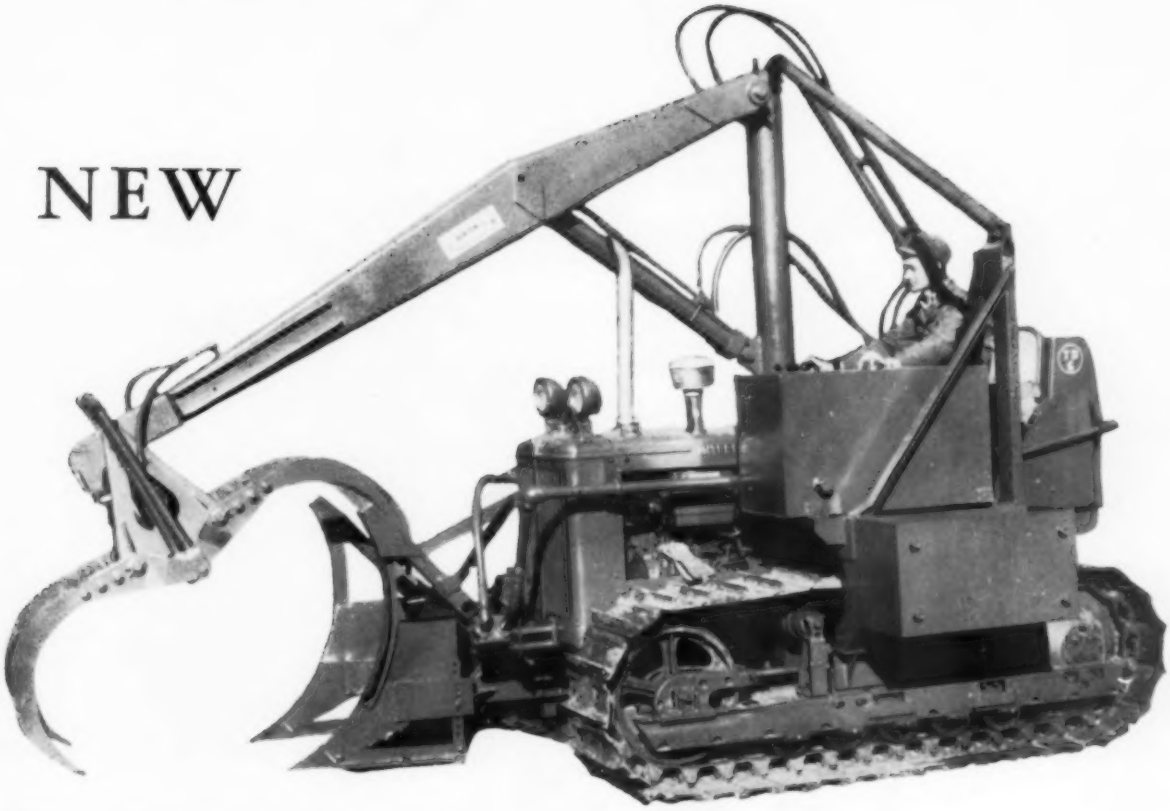

CRAWLER CANE LOADER MOUNTING FOR INTERNATIONAL TD-6, TD-9 AND CATERPILLAR D-4. Also available on wheel tractors—

NO TRACTOR CONTROL MODIFICATION

EASY EFFICIENT OPERATION

ECONOMICAL ATTACHMENT

RELEASES TRACTOR AFTER CROP

TORSION BAR GRAB SUSPENSION

CUSHIONED HYDRAULICS

Developed by J&L Engineering Co., Inc.

Manufacturers of a Complete Line of Sugar Cane Harvesters, Loaders and Hauling Equipment.

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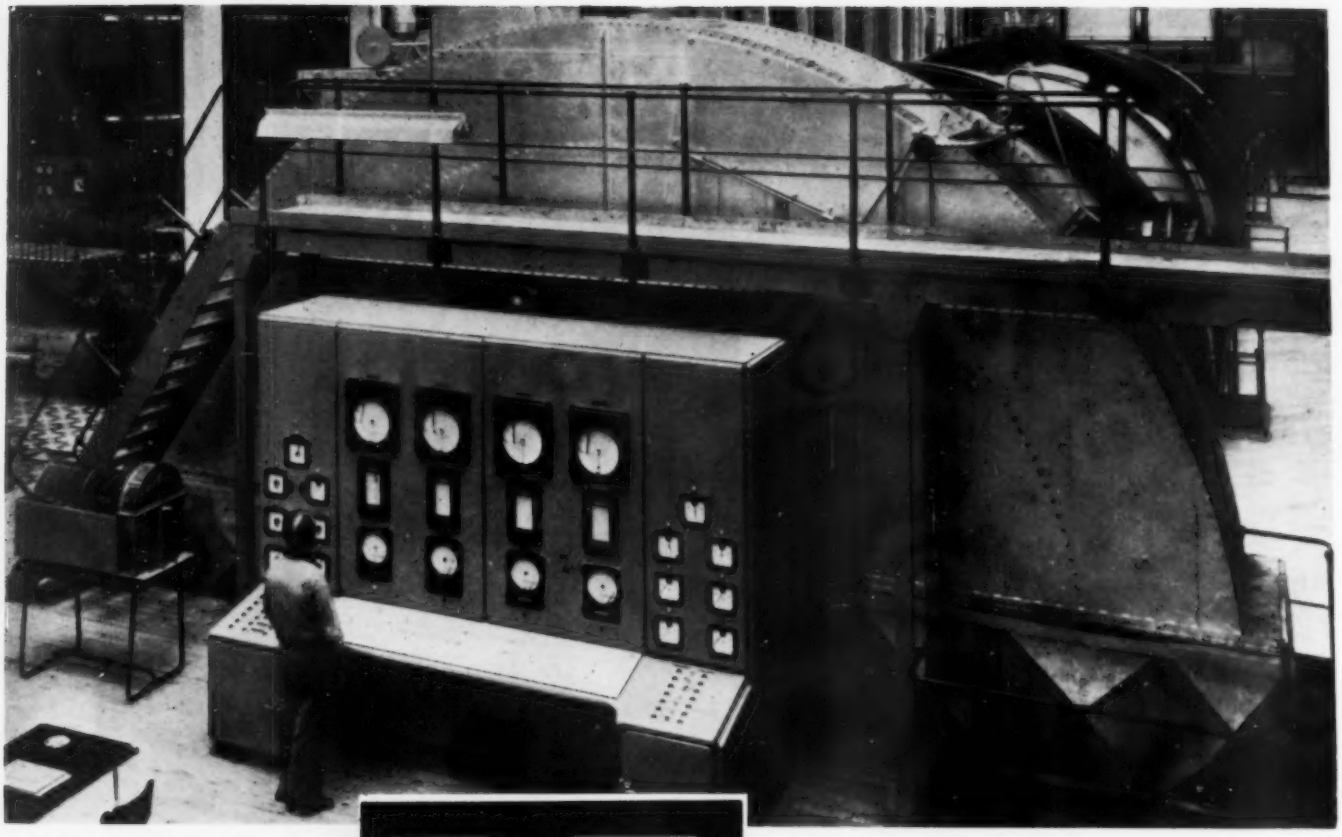

R.T. Continuous Diffuser with capacity of 3000 tons of beets per day.

R.T. CONTINUOUS DIFFUSER

The only diffuser which includes all the following advantages:

1. Ideal flexibility of operation, with perfect regularity of results; a temporary shutdown, even a long one, has no undesirable effects.
2. Perfectly controlled counter-current throughput of juice and cossettes; there is no channeling, nor stagnant zones.
3. Retention time of the juice is only half as long as that of the cossettes; there are no undetermined losses during the time needed for thorough extraction of the sugar.
4. Losses of sugar in pulp, with equal juice drafts, are the least.
5. The internal structure of the diffuser comprises no moving mechanical parts.

Societe Sucriere D'Etudes et de Construction

RUE AENDOREN, 1 TIRLEMONT, BELGIUM

it's time to survey your mill and

ORDER FULTON MILL PARTS NOW!

Time flies—next milling season will be here sooner than you think!

Plan ahead—order needed parts now so you'll have them for installation BEFORE the milling season arrives!

If you need help—a Fulton representative will contact you. Just ask!

Act today—order now!

For more profits per ton of cane the answer is always . . .

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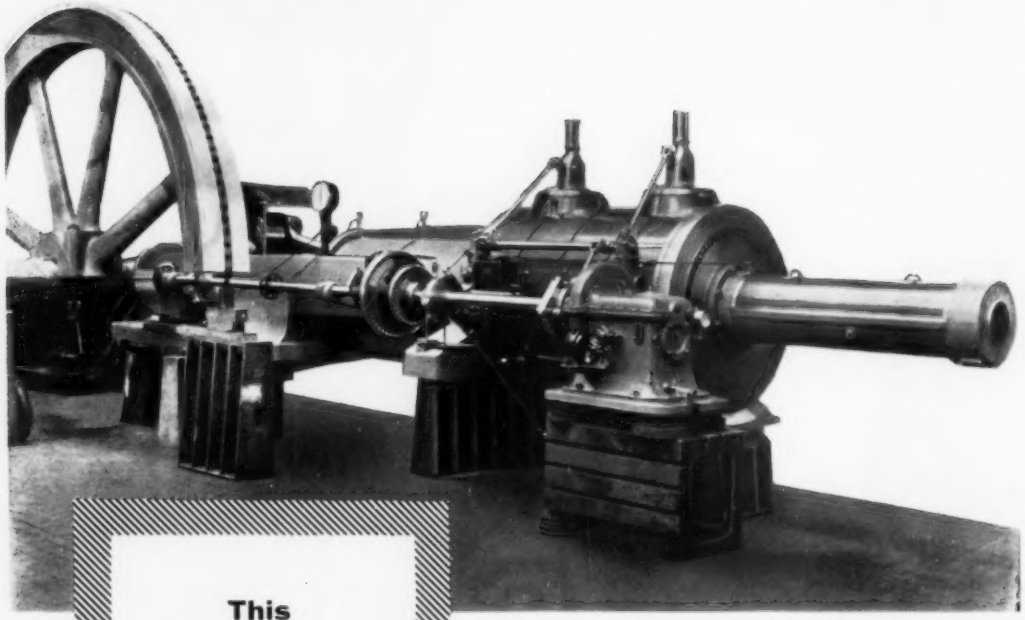
FULTON IRON WORKS CO.
St. Louis 10, Missouri, U. S. A.

Bauduin



This Stork-Werkspoor steam engine will always be the cheapest motive power for the mills in your sugar factory

Non-stop milling requires **absolute reliability** in a prime mover!

STORK-WERKSPOOR dropvalve Mill Engines provide not only this, but also:

speed control by patented oil pressure govenor ⋆ speed adjustment between wide limits ⋆ low steam consumption, also at reduced loads ⋆ direct reversibility ⋆ economy through low maintenance costs

Also available with closed frame construction for higher speeds.

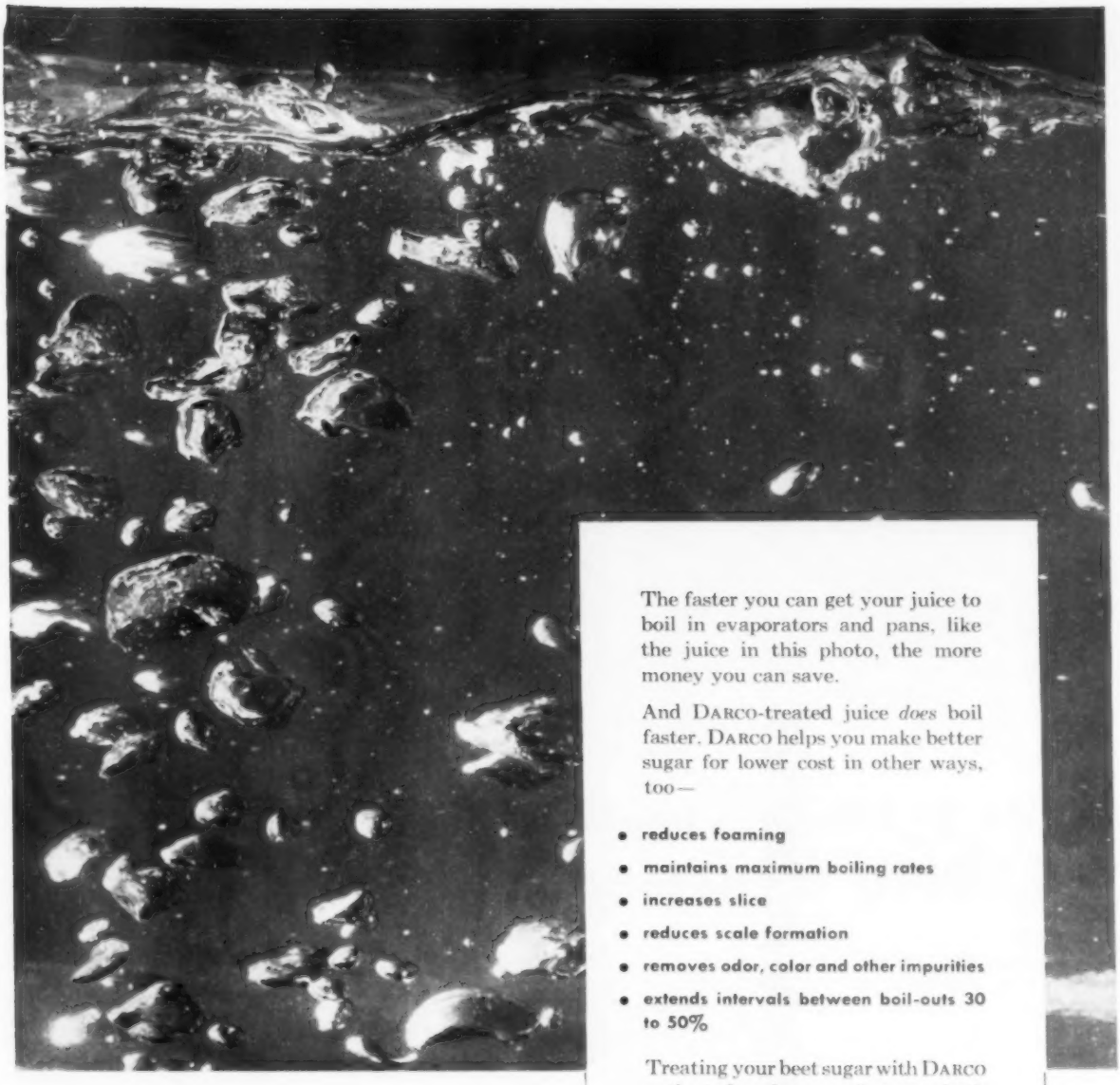
Let STORK - WERKSPOOR build your complete sugar factory.

The advantages are obvious:

harmony of construction and unity of design result in a well balanced manufacturing process and ensure efficiency, reliability and economy.

STORK HENGELO — VERENIGDE MACHINEFABRIEKEN V·M·F NEDERLAND STORK • WERKSPOOR — **WERKSPOOR** AMSTERDAM

FOR ALL SUGAR MACHINERY APPLY TO GEBR. STORK & CO N.V. - HENGELO - NETHERLANDS



The faster you can get your juice to boil in evaporators and pans, like the juice in this photo, the more money you can save.

And DARCO-treated juice *does* boil faster. DARCO helps you make better sugar for lower cost in other ways, too—

- **reduces foaming**
- **maintains maximum boiling rates**
- **increases slice**
- **reduces scale formation**
- **removes odor, color and other impurities**
- **extends intervals between boil-outs 30 to 50%**

Treating your beet sugar with DARCO activated carbon can improve both the quality of your beet sugar and your production economy. Let us show you how this low-cost process can be applied in your plant. Write or call us today.

DARCO®-treated beet juice boils faster

DARCO

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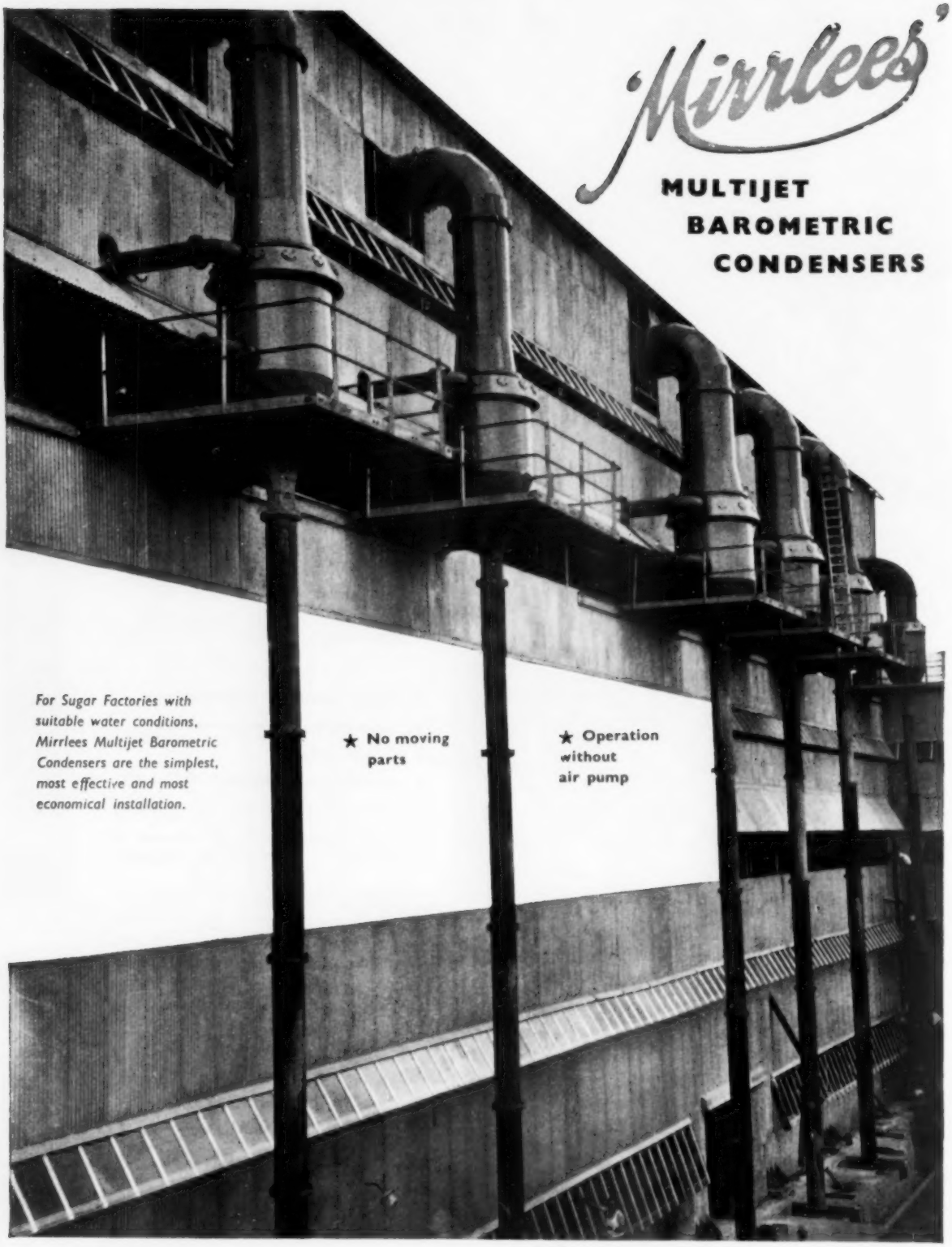

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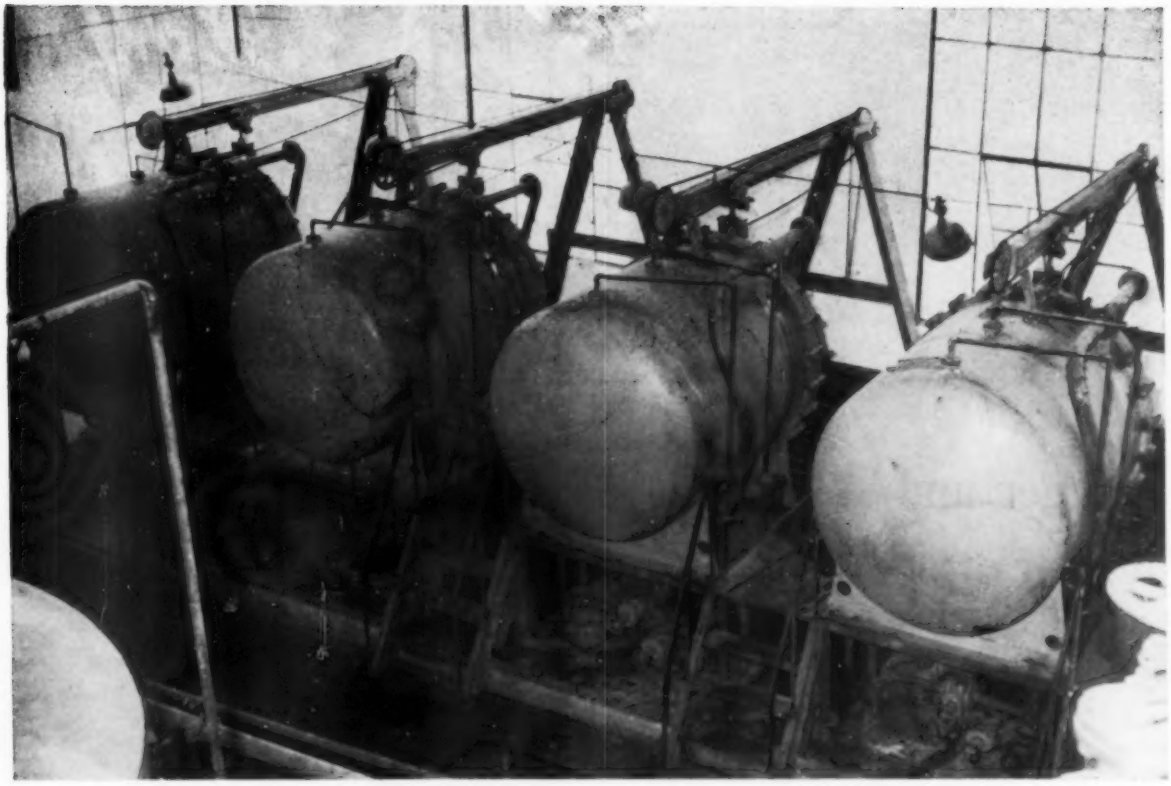

Industrial helps sugar refinery in Middle East yield sweeter profit!

FILTERS AND PROCESS

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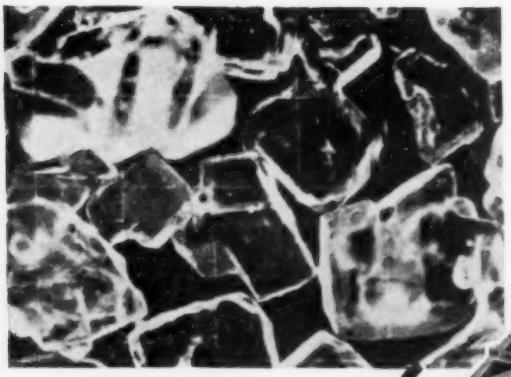

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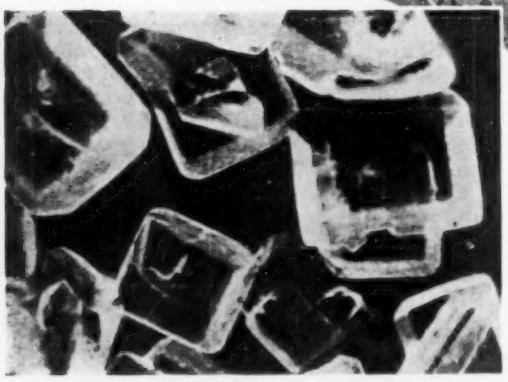

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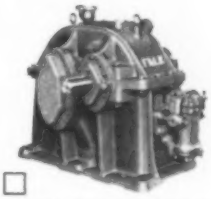

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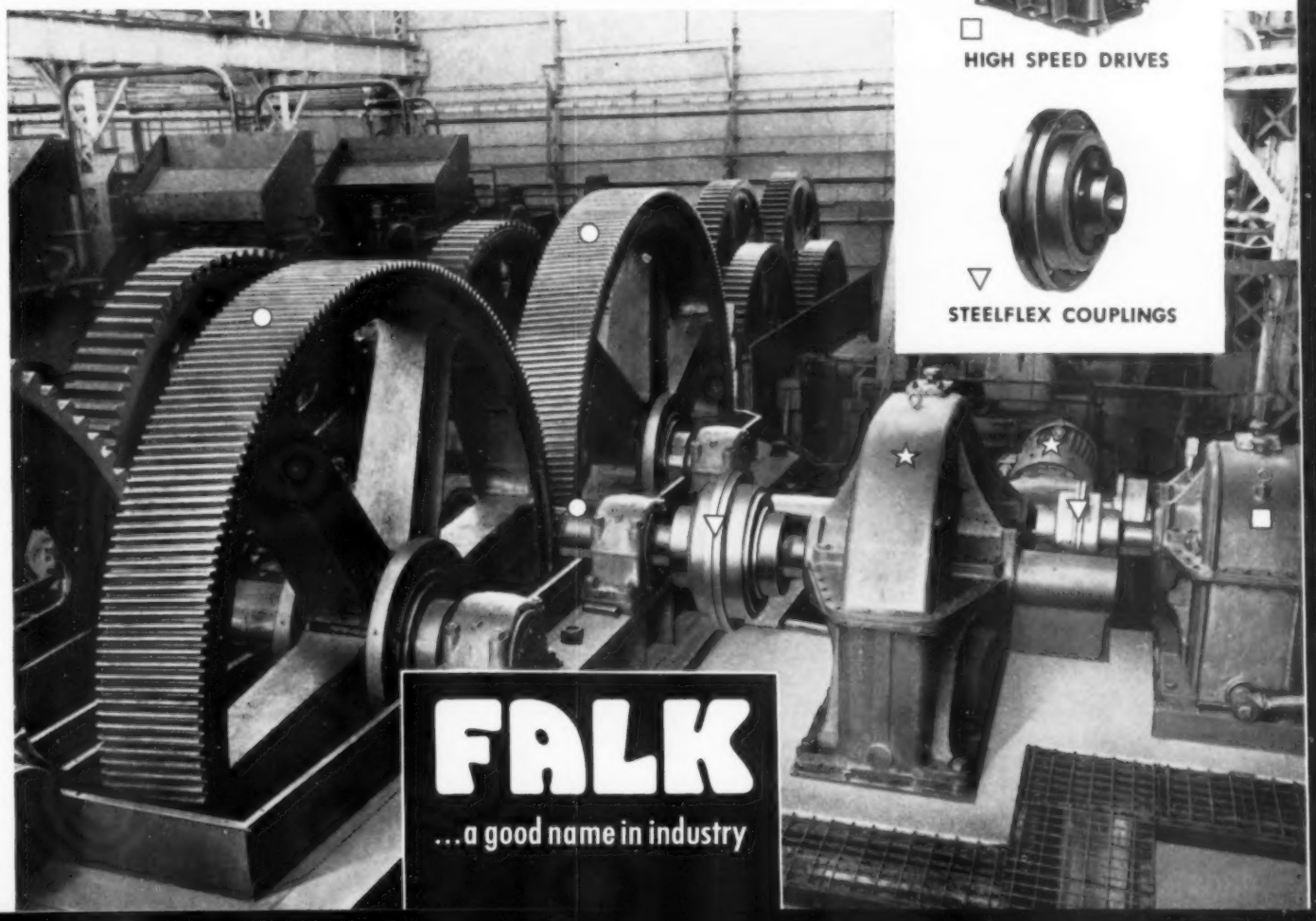

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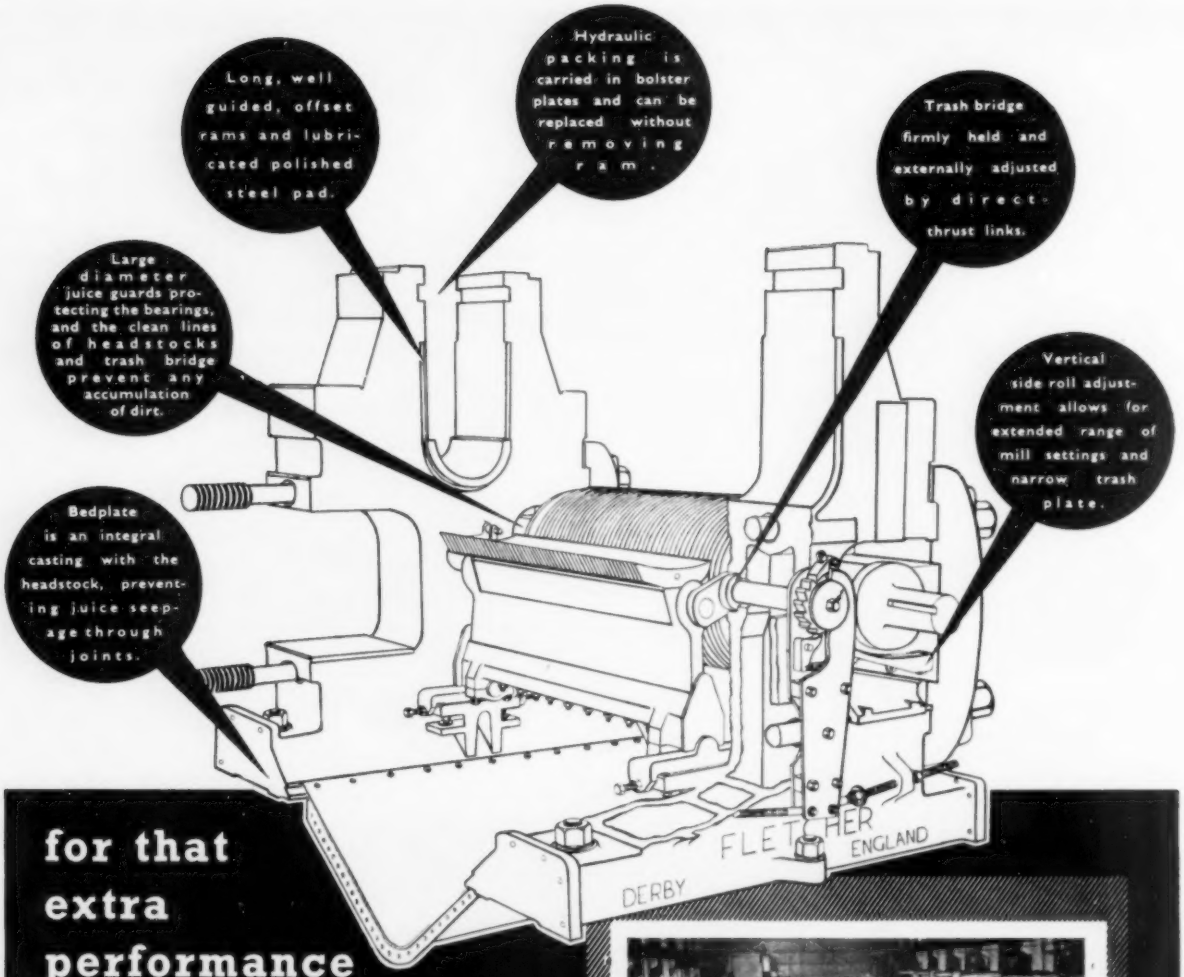

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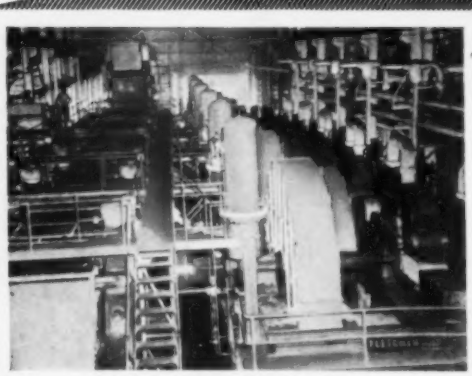

18 roller 34" x 66" turbine driven FLETCHER mill tandem at Boca Chica, Dominican Republic.

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Local Industry Tops National Average

California Sugar Beet Growers' Meeting

Re-elected officers of the California Beet Growers' Association, Ltd. are (from l. to r.): Gordon Lyons, secretary-treasurer and executive manager; Owen Rice, president; and Chester Locke, vice president.

California sugar beet growers and the U. S. beet sugar industry in general were praised as "best in the world" in several important categories by speakers at the annual meeting of the California Beet Growers Association, Ltd., in San Francisco January 24. More than 500 growers attended the session.

Among the speakers stressing the production efficiency of the American beet sugar industry were a government official, a farm economist, and one of the industry's chief competitors.

Lawrence Myers, Washington, D. C., director of the Agriculture Department's sugar division, said American beet sugar producers comprise "the most efficient beet sugar industry in the world in terms of output per man hour."

Earl Coke, San Francisco, farm economist and vice president of the Bank of America, declared: "The California industry is entitled to be proud of topping all state records in 1957 in average per-acre yield of sugar beets." He pointed out that during the year just ended California growers averaged 21.67 tons of beets per acre, well above the national average of 17.4 tons, which was itself a new all-time high.

Most glowing praise of the California and national beet sugar industry came, however, from a representative of Puerto Rican cane sugar producers, who are stout competitors in some U. S. sugar marketing areas.

Dudley Smith, Washington, D.C., vice president of the Association of Sugar Producers of Puerto Rico, told the group that California sugar beet growers, with a six-months growing season, are producing on each acre of land enough beets to yield three tons of refined sugar, or an average of one-half ton of sugar a month.

"This is higher than for any other domestic area," Smith said, "including the offshore tropical areas, and is two and a half to three times as high as the sugar produced per acre per month for the entire sugar world outside the United States. This level of production and this efficiency in the utilization of agricultural land seem to be unsurpassed elsewhere in the entire sugar world."

Using another yardstick—the amount of sugar produced by one day of field labor—U.S. beet sugar growers also lead all foreign producers, Smith said. "On that basis," he declared, "one day of field labor in California and other U.S. sugar beet fields produces approximately 535 pounds of sugar."

The comparable figure for many of the less-developed sugar producing areas, he added, was 40 pounds of sugar, with the average for the entire cane sugar world outside the United States not in excess of 80 pounds.

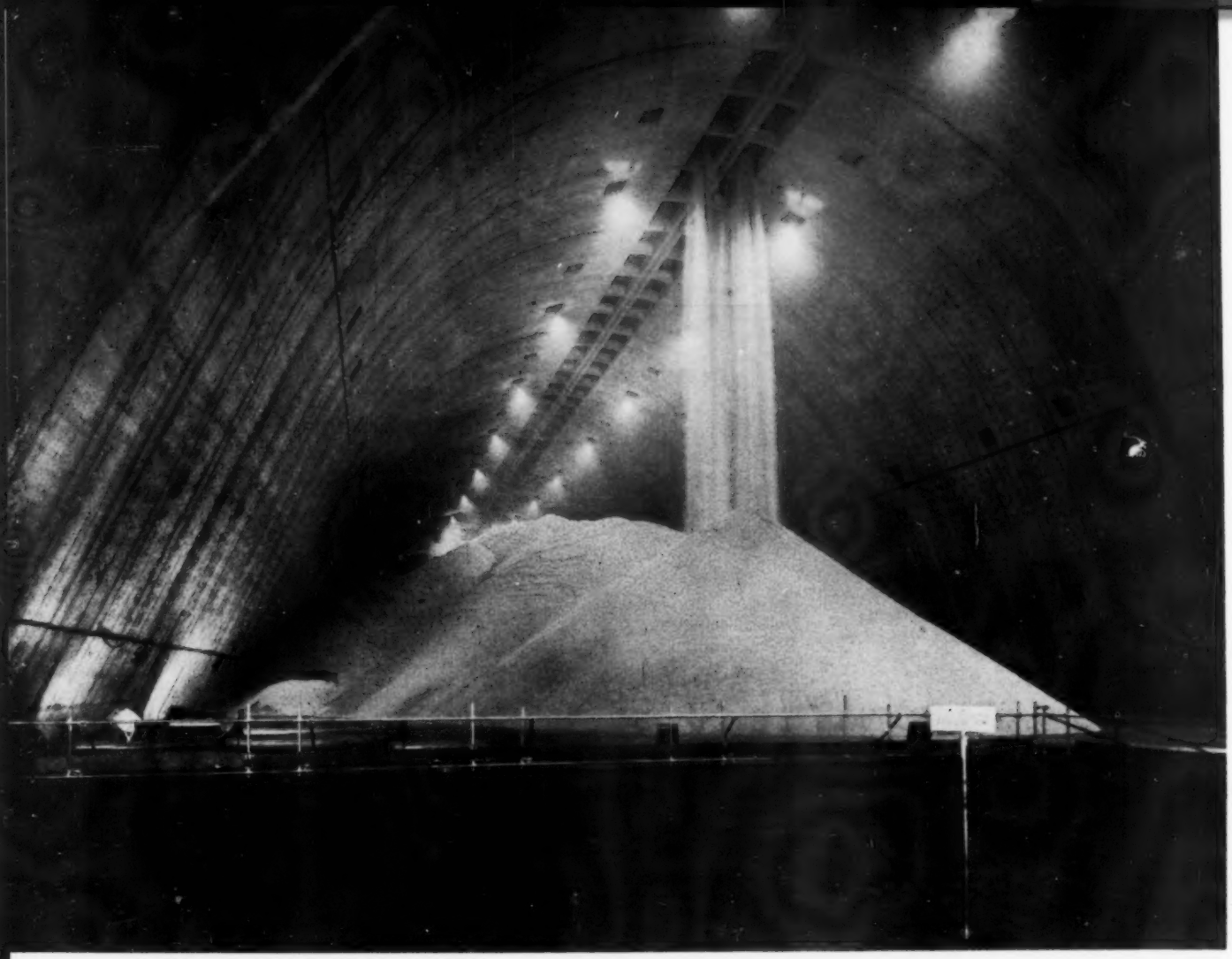
The consumer benefits from the American sugar producer's efficiency, Smith declared, by being able to purchase sugar at prices among the lowest in the world. At the same time, wages paid on U.S. sugar beet farms are considerably higher than are paid workers in some of the areas producing for the so-called world market.

Sugar Director Myers also described adjustments in the U.S. sugar quotas during 1957 aimed at maintaining a stable sugar market for American consumers. Because of upset world conditions beginning late in 1956, he said, "the matters at issue in raising quotas last year were not minor changes in prices either upward or downward. The price threat was one of explosive proportions."

Myers declared: "Although we must thank a kindly Providence for making it possible to maintain a stable domestic sugar market during the past year, our sugar program certainly helped to do so. Again, as in 1950 and 1951, we have a striking example of the sugar program working for the benefit of the consumer as well as for the producer."

Another speaker from the U.S. Department of Agriculture, M. J. Copley, director of the USDA utilization research laboratory at Albany, Calif, said finding new uses for agricultural products "has a most important role" in the attack on American agriculture's two serious problems of surpluses and competition from synthetic foods and fibers. He pointed out that a fertile field for utilization research lies with sugar beets, too. "On the average sugar beets produce about as much feed (from the tops and pulp) as corn

(Continued on page 45)



Tate & Lyle's Bulk Handling At Liverpool

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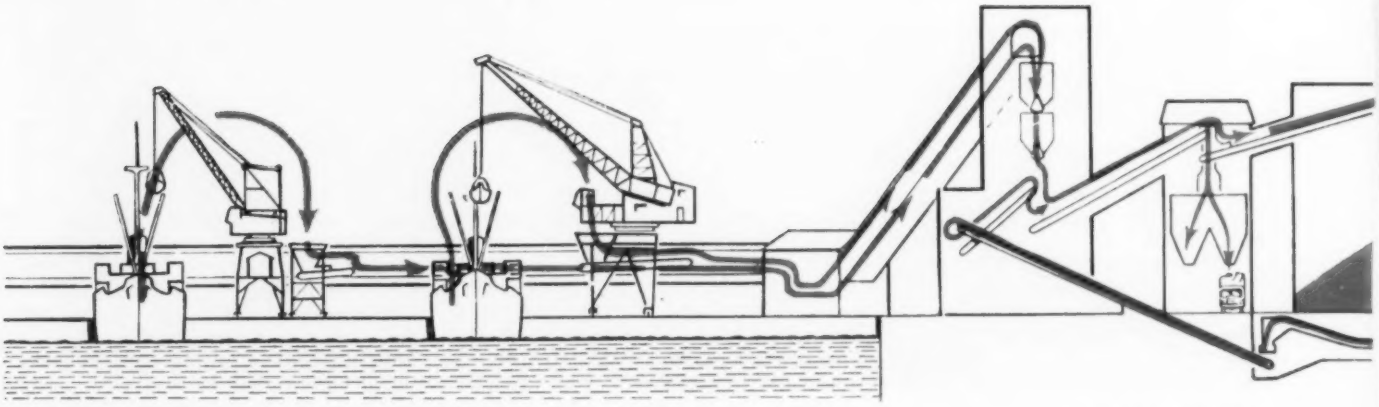
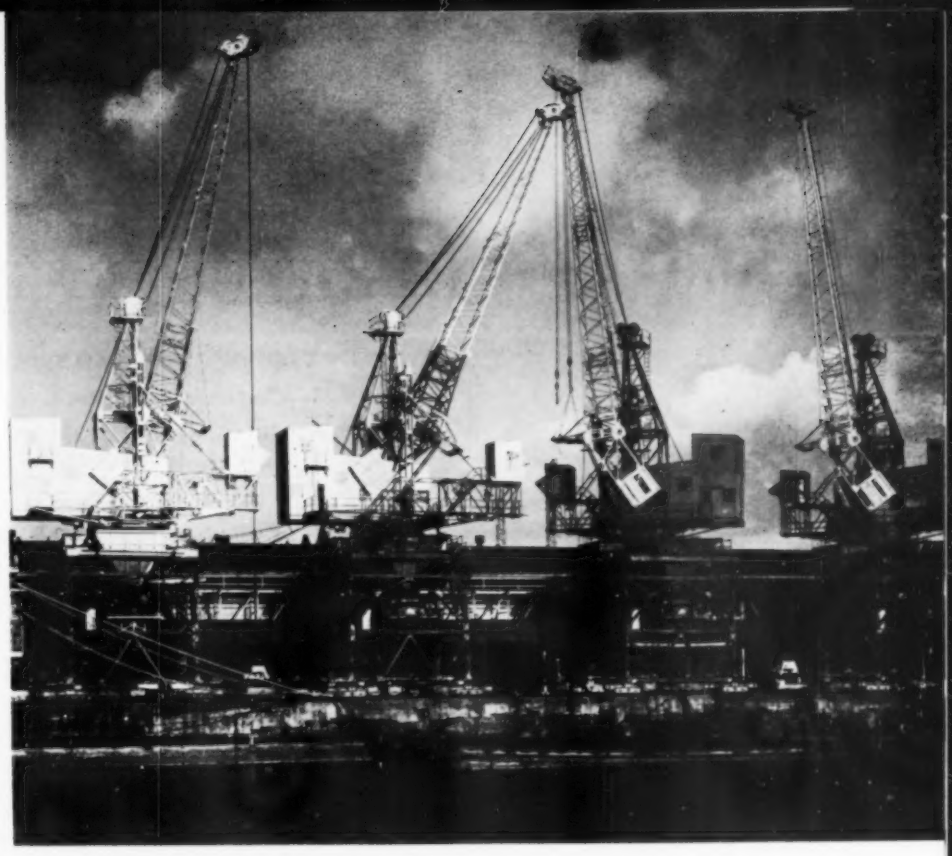
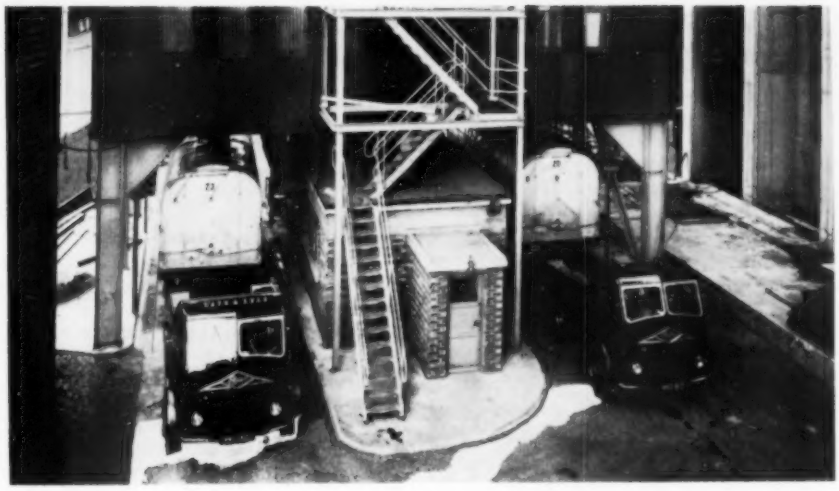


The Huskisson Dock Project recently completed by Tate & Lyle at Liverpool, England and illustrated on these pages provides modern facilities for unloading raw sugar delivered to the docks in bulk, storing in a 100,000 ton warehouse and delivering to the refinery in special vehicles. Part of the unloading equipment has been in service since 1952; recent improvements have increased tremendously the speed and convenience of unloading.

The docks can accommodate vessels up to 10,000 tons and sugar will be received from specially designed bulk sugar vessels and from conventional ships carrying raws in bulk. In addition to the four cranes that have served the docks since 1952, four new kangaroo type cranes have been installed as illustrated at upper right. Cranes have a five-ton grab with hoppers built into the front of the crane itself. The four existing cranes had a capacity of 340 tons per hour; the new cranes have a capacity of 600 tons per hour. The conveyor system, as shown in the simplified diagram below, has been designed to keep each cargo separate until weighed and tested.

From the dock the sugar cargoes are delivered individually to the weighing tower



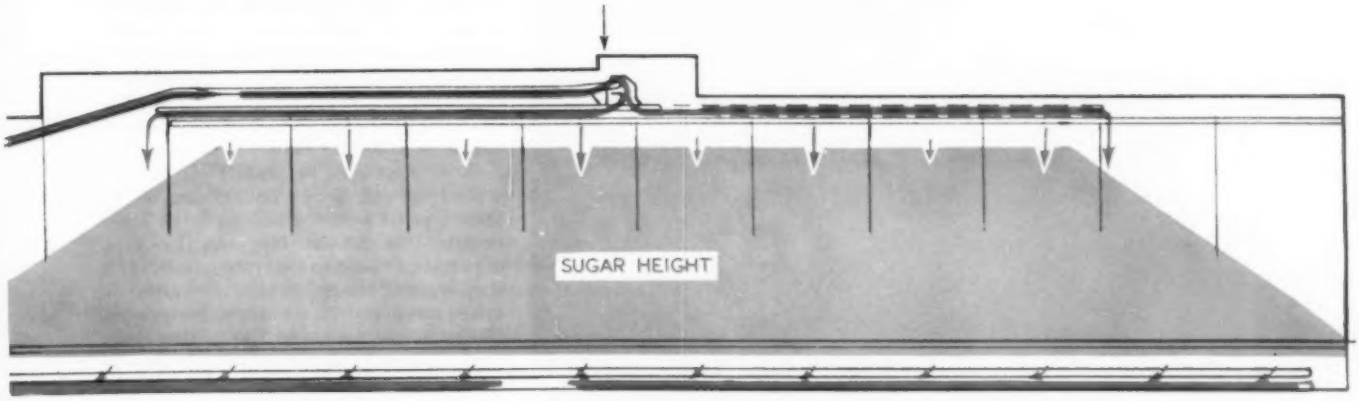


where they are dropped into one of three Servo Balans weighing machines each capable of weighing 400 tons of raw sugar per hour in 15,000 lb. lots. Determination of price, quality analysis, calculation of duty and other records originate at this point.

As will be seen in the center picture on this page, the vehicle filling tower is composed of two weighbridges and a weighing office. Raw sugar from the ships, after passing the weighing tower, goes to the vehicle filling tower for transhipment to the refinery; or it may continue on the conveyor system to the warehouse.

The storage silo is one of the largest yet built. Parabolic in shape as shown in the illustration on the opposite page, it is 166 ft. in width at base with a height to apex of 86 ft. and a length of 543 ft. As will be

(*Continued on page* 45)



Farrel Completes Tandem For South Porto Rico Co.

7000 TON MILL FOR CENTRAL ROMANA

By Philip H. Dreissigacker
Sales-Engineering Manager
Farrel-Birmingham Co., Inc.

ONE of the world's most modern mill tandems sailed from New York harbor for the Dominican Republic in January 1958 just a year after it had been ordered. The mill is intended for Central Romana, owned and operated by the South Porto Rico Sugar Company. It is expected to grind part of the current crop since erection will be completed in the first quarter of 1958.

The huge mill, embodying many innovations, was designed and constructed by Farrel-Birmingham Company of Ansonia, Connecticut. It consists of six 38 in. by 84 in. three-roll mills which, it is estimated, will grind 7,000 tons of cane per day.

With Ansonia, Connecticut under a blanket of snow in sharp contrast to the future location of the mill, top ranking officers of South Porto Rico visited the Farrel plant on December 10th to see the completely assembled tandem. Visitors included W. T. Hennessey, Chairman of the Board, G. D. Debevois, President, and E. S. Spaeth, Vice-president of South Porto Rico. They were accompanied by W. K. Peay, chief engineer of Central Romana, R. V. Marionneaux, manager of the Central and C. English, a member of the mangagement group of the sugar mill.

In addition to the size of the tandem and its unusual features, Farrel management was proud of the dispatch with which the order was completed. South Porto Rico placed the original order in February 1957; mill was shipped in January 1958; and, will be in operation 15 months after the first order had been placed.

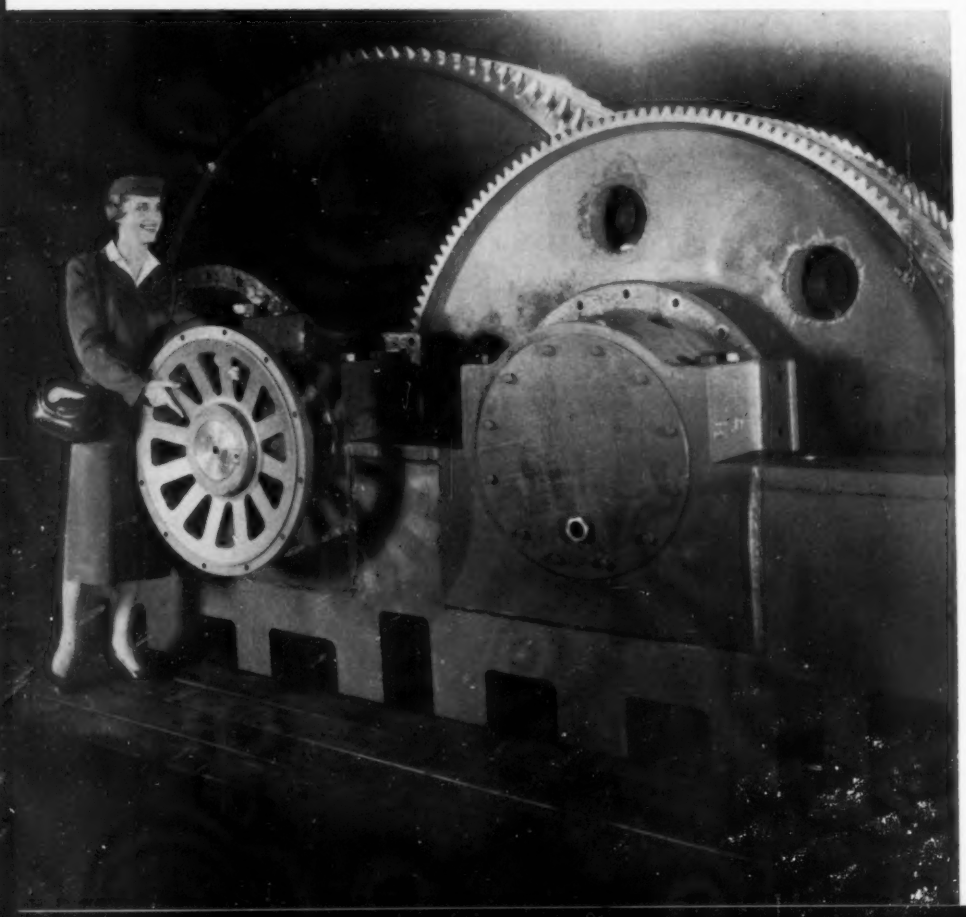
The tandem consists of six three-roll mills of identical design except for roll grooving which is of progressively smaller pitch as provided in specifications furnished by engineers of the South Porto Rico Company. Each mill is driven by a 815 h.p., 4800 r.p.m., Murray steam turbine, delivering a maximum of 1290 h.p. at 5000 r.p.m. Drive is through two double-reduction gears resulting in a top roll speed of 67 feet per minute. Capacity is rated as 7,000 tons of cane per 24 hours.

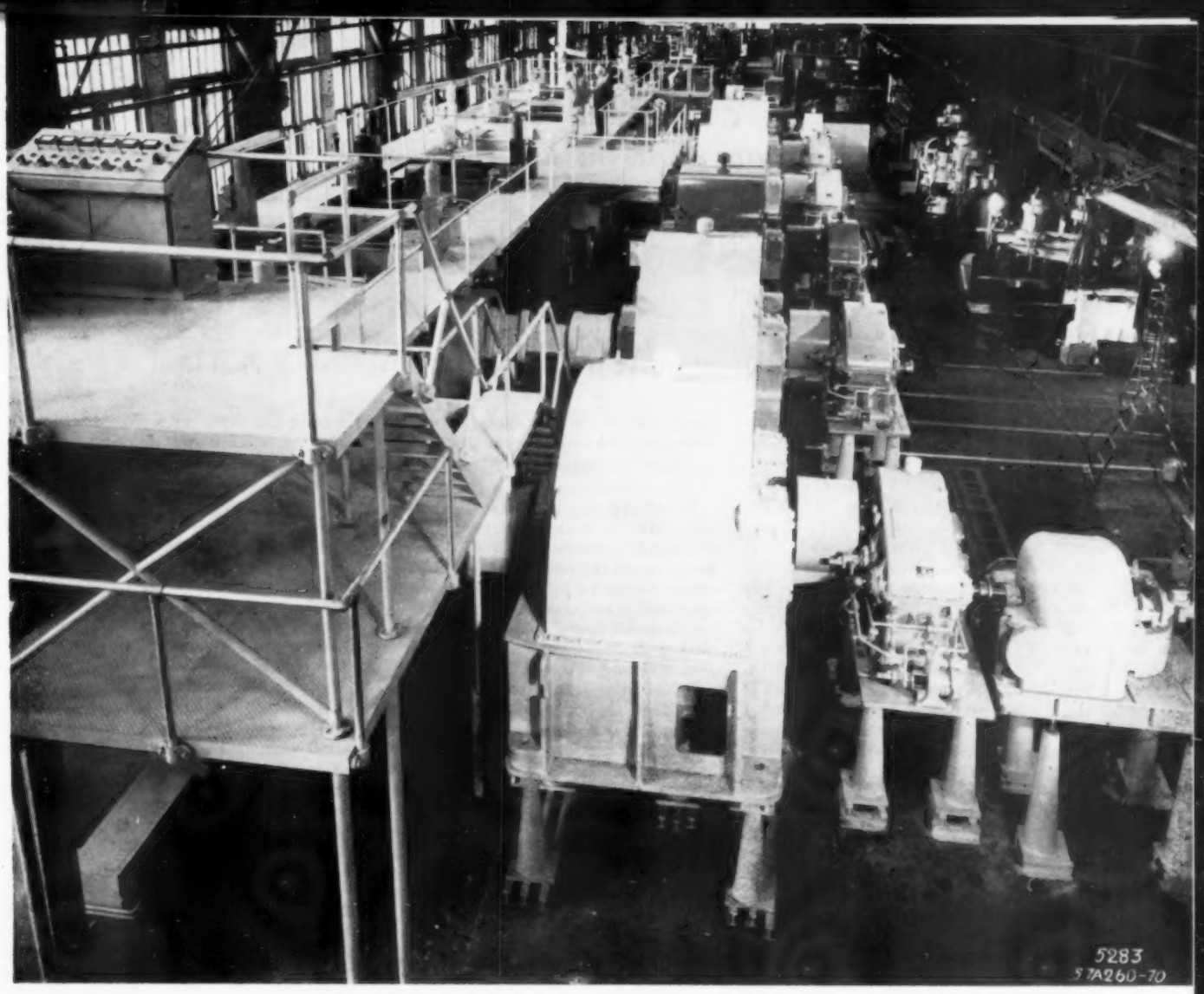
Gearing for each individual mill is completely separated and independent of adjacent mills. The first two reductions from the turbine are contained in a high-speed, double-reduction gear unit completely sealed and lubricated by means of a self-contained oil pump, filter and cooling system. Coupled to it is the second double reduction unit, also self-contained within its own gear case and splash lubricated from a reservoir in the base of the case. Self-aligning, spherical roller bearings are provided for this second speed reduction case and reduce friction to a minimum as may be seen from the accompanying illustration.

The second reduction gear unit is coupled to the mill by means of a standard, square-sleeve mill coupling. In previous mill designs, this coupling was expected to break if the mill met a sudden violent stoppage; to avoid such costly accidents Farrel has installed a Wichita air-operated clutch between the two gear units to make this a cut-off point if a stoppage should occur which might previously have broken the mill coupling. Presence of this air-clutch permits operating the turbine for inspection while the mill is disconnected and provides an alternate means of stopping the mill independently of the turbine by valves operated from the control console.

All gearing for the tandem is cut-tooth, double-helical type turned out by Farrel's Buffalo plant. The smaller gears and pinions are alloy steel forgings; the large gears are fabricated steel with alloy steel rims. The intermediate carriers are Farrel's patented rubber belt design. In this case these carriers were specified by South Porto Rico as a result of satisfactory performance of the same type of intermediate carrier on other tandems over the past few years. Unit-type construction permits easy removal as a single piece. Integral with each carrier is a feed roll to provide a uniform, compressed blanket to the cane roll. The feeding chute to the first mill has an underfeed roller as well as a conventional overfeed roller to insure positive feeding. These rollers and

Lady visitor turns slow speed reduction gear unit by hand to demonstrate friction reduction achieved by use of self-aligning, sperical roller bearings.





After construction the mill was completely assembled at the Ansonia, Connecticut shops of Farrel-Birmingham for inspection by top officers of the South Porto Rico Sugar Company. Note control console at upper left. Murray turbines driving mill through two double-reduction units. Each mill unit is painted a distinctive color to facilitate assembly in Dominican Republic.

the carriers with their feed rolls are driven in each case from the cane roll through a Wichita air clutch and gearbox.

As may be seen in the accompanying illustration, the centralized control panel is positioned so as to give the operator a full view of the entire mill. From this point the individual air clutches and individual mill speeds can be controlled.

Juice pans are unit-type, double-vee Everdur equipped with chokeless pumps for maceration circulation and with Link Belt vibrating screen strainers for final juice straining.

Two sets of Farrel type K-4 cane knives are set ahead of the tandem, the first set having two inch knife spacing and the second, three-quarter inch spacing. Each set is driven by a 600 h.p., 600 r.p.m. motor.

The usual Farrel features with some refinements have been included. These comprise: one-piece housing, the heavy pin locking arrangement of the top caps, hinged side caps which swing down to form platforms on which side rolls in their boxes can be slid out and removed vertically, ladder-type roller bearings which are inserted between the top journal box and the housing in the cane side for the elimination of binding. Pressure plates are provided to give freedom of vertical movement and self-alignment without binding, improved hydraulic rams in conjunction with Edwards accumulators and automatic lubrication to all mill bearings centralized on the control station atop the tandem.

■

Sugar Industry Technicians Annual Meeting

Board of Directors of Sugar Industry Technicians will meet in New York on May 11th, according to an announcement of President Frank A. Monroe, Jr. The Seventeenth Annual Meeting of S.I.T. will be held at the National Republican Club, 54 West 40th Street, New York City, with technical sessions starting on Monday, May 12th and continuing through the following day. While the complete program will be published in April SUGAR Y AZUCAR, it is of interest to note that a paper will be delivered on "Design and Performance of Calandria Pans" based on the work that has been done by California & Hawaiian Sugar Refining Company. H. J. Jacobs, South Coast Corporation, will deliver a paper on "Layer Filtration in the Treatment of Refinery Melt Liquor with Powdered Activated Carbon." A paper on "Cost Accounting of Various Packages That Carry Differentials over Bulk Sugar" will deal with work done by Savannah Sugar Refining Corp.

Arrangements have been made for members attending the meeting to inspect the laboratories of the New York Sugar Trade Laboratory and to attend a meeting of the Zerban Sugarmen's Association at the Chemists Club on May 14th.

Review of an Important New Book

SUGAR – from Scarcity to Surplus

by Hubert Edson*

HERE is the life story of a cane sugar technologist which is probably without a parallel in the history of this far flung industry—a record of 62 continuous years of arduous and responsible service in many lands, punctuated by alternating episodes of disappointment and brilliant success, personal hardships and technological triumphs that have contributed not a little to the science and art of manufacturing sugar from sugar cane.

It began away back in 1888 when a 17-year-old Indiana farm boy was installed as a bottle washer by his uncle, the famous Dr. Harvey W. Wiley, in the sugar laboratory of the U. S. Department of Agriculture. At that time the American sugar market was facing an uneasy situation. Population was expanding and per capita sugar consumption, though less than half what it is now, was increasing against a meager domestic supply contributed by a few miserable mills in Louisiana. The American beet sugar industry was just a-borning, and had reached a capacity of less than 700 tons a year, but altogether the domestic supply was only ten percent of the national requirement. Small amounts were coming from Hawaii, Puerto Rico, the Philippines and Cuba, and the rest from such distant lands as Germany and Java. The price of sugar at the time, though low in contrast with the inflated levels of 1958, was relatively high and was obviously holding consumption in check. Dr. Wiley had little expectation of increased production in Louisiana or of an immediate expansion of the sugar beet area, and turned his attention to sorghum as a promising raw material which then had a higher sugar content than sugar beet.

Meanwhile, his bottle washer was eagerly assimilating the elements of sugar chemistry and even before becoming old enough to vote he was put in charge of analytical tests for the sorghum research project. At the same time, Dr. Wiley was urging the Louisiana planters to adopt the diffusion process. Two of them essayed the matter with thoroughly discouraging results.

But Dr. Wiley's proddings had focussed their attention on the fact that their crushing mills were failing by far to press out more than three-fourths of the sugar juice in the cane, and they asked his help in finding out the reason. His answer was to send down three of his bright young men, including Edson, who was assigned to the Calumet factory.

Here Edson was favored by one of those rare quirks of fortune that decide the fates of men. It so happened that the cane produced during the 1888 season was of a high quality unequaled before or since. The mill ran smoothly and at the end of the campaign, the tabulated figures showed that more than 200 lbs. of sugar had been extracted per ton of cane instead of the usual 150. With characteristic methodicity, young Edson kept a meticulous log of the work, showing the amount of sugar that came in with the cane and the amount that came out and into the waiting sugar barrels. Extraction was close to 92%.

Dr. Wiley was so gratified by this result that he caused Edson's report to be published as an official bulletin of the Department of Agriculture. The surprise of the planters was equally great. Visitors flocked to observe at Calumet, and the factories began to employ chemists.

This episode was destined to have a far-reaching effect on the technology of the cane sugar industry. It began to appear that nearly all the sugar in the cane could be recovered if the stalks of cane arriving at the mill were properly prepared and pressed hard enough. The previous low extractions were due to the weakness of the small mills, and the obvious recourse would be to install heavier and better designed machinery. The answer took the form of long tandems of three-roller mills and the use of crushers, shredders and knives to reduce the tough cane stalks to small fragments that would give up the juice under high pressure. There was no longer talk of a sorghum industry or of application of diffusion to sugar cane.

Edson was promptly installed as factory superintendent and then manager of both factory and field operation but was given no part in the commercial administration which left his career exposed to circumstances beyond his control. Financial mismanagement ruined the company and he had to look for another job. He spent a brief season in Hawaii. He returned to Calumet under better auspices, which worsened again. Then through a long succession of years he held positions in Cuba, San Domingo, and at length attained superintendency of the giant factory at Guanica in Puerto Rico. By this time he had developed a plan which was to lead him into a wider field of activities than he could hope to secure by remaining on a plantation. He had a wide acquaintance among sugar men, he had visited many cane sugar factories and had become familiar with their methods and problems. These observations suggested that there was a place for a managing and operating company which could take over and manage the affairs of concerns that were not being run efficiently and put them back in proper shape. The idea materialized in formation of the West India Management and Consultation Company, and was ready for business just before outbreak of World War I.

All at once Edson and his management company became tremendously and profitably active. In 1914, raw cane sugar was selling at two cents a pound. Foreign supplies of sugar were immediately shut off, and the price rose to 4, 5, 8, 10 and 20 cents. Existing factories began to make very attractive profits. Feverish efforts were put forth to expand producing capacity. New land was taken into cultivation and, in all haste, hundreds of millions of dollars were expended for enlargement of old, and for building new factories. In this "dance of the millions," Edson was called on to display, as never before, his ability as a planner and a manager and to meet urgent and baffling situations. Eventually, this frenzied era was ended with the return of peace. The price fell to the old levels and the cycle was repeated by the incidence and end of World War II.

The narrative makes easy reading because Mr. Edson has a gift of clear expression and a sense of timing and proportion; once the book is picked up it is hard to lay it down even though the reader's contact with the practical manufacture of sugar may not be very close. His judgment of men and measures is sharp and precise and, as events proved, justified; at the same time he frankly acknowledges his own mistakes. Numerous incidents are related, some humorous, some tragic or near tragic, and packed with human interest.

His book will surely have a definite place in the history of cane sugar in the Western hemisphere, especially in its managerial aspects, and will be profitable reading for young men preparing for careers in this industry.

Dr. O. W. Willcox

*Sugar, from scarcity to surplus, by Hubert Edson. Foreword by Dr. Pieter Honig. Published by Chemical Publishing Company, New York, 1958. 217 pages. $5.00.

Sugar's Progress in

HUMAN RELATIONS

Roy J. Leffingwell

MANAGEMENT—*Without Superior Men, Machinery is Worthless*

The development of effective management continues to be a major business problem throughout the world. Accordingly, there is a marked trend by many organizations to seek managerial practices that will not only give higher productivity now, but will train company leaders for the future.

Fundamentally, all management practices can be classified under the two general categories of:

1. Autocratic
2. Participative

Autocratic management is one in which the boss is the exclusive authority in all matters. He does not want his help to know what is going on. They need only do what they are told. He assigns little responsibility to anyone. No authority is delegated to even his most trusted supervisors.

This type of management is not entirely without merit. The manager knows every detail of the operation. He knows where every penny is spent. But, experiments show that autocratic management has many weaknesses. Productivity among employees is usually low. The operation collapses when the boss is away for even a short time. And, more important, there is no reserve of management ability being developed for the future.

Participative management, on the other hand, is one in which there is decentralized responsibility with coordinated control and delegated responsibility. The boss delegates his responsibility to department heads or supervisors. He authorizes them to carry out work in his name, and gives them the authority to do the job—under coordinated control. This type of management can be just as effective in a two-man shop as in the largest corporation.

Alfred P. Sloan, Jr., now honorary chairman of the board of directors of General Motors Corp., has been credited with the development of the "decentralized responsibility with coordinated control" management concept. It is accepted as commonplace today, but it was revolutionary when first introduced.

This principle of management has done much to vitalize American industry. Mr. Sloan used as the basis of his theory that to prosper and grow, any business needs a constant flow of ideas from the top to the bottom—and from the bottom to the top. And, he never issued an order. He was the master executive.

The result has been that General Motors is a world-wide operation and highly successful. Further, GM has developed a reserve of management talent equalled by few other companies.

A GM executive once said: "Anyone can buy machinery; but without superior men machinery is worthless."

Those in the sugar industry might profitably take a look at participative management as a means of improving productivity and assuring a reserve of manpower to continue the operation of machinery.

Group Insurance

(First in a series of articles on employee benefits widely used in sugar areas of the world. Next month, "Health and Medical Plans" will be discussed. Your comments are invited.)

Group insurance may be defined as the insurance of a group of individuals by means of a blanket or single insurance contract. The first policy of this type was written in 1911 and since has had phenomenal growth.

At first, only group insurance that provided payment in case of death, was written. Now, such policies include:

1. Life insurance
2. Death and dismemberment
3. Hospital expense
4. Medical and surgical expense
5. Temporary, nonoccupational, accident and illness disability

By its very nature, group insurance lends itself to use by employers who wish to make available to their employees benefits that offer security through insurance. This type of program does much to satisfy the workers need for security against adversity. And, it provides the employer a means of standardizing the handling of hardship cases. There is no more "passing the hat" to which the employer is always expected to contribute generously. Insurance programs tend to attract efficient workers and decrease labor turnover. Part of this is due to the fact that the families of employees feel more secure and happy when so protected. Lastly, such a policy gives the employer desirable publicity and prestige in the community where his employees live.

Group insurance premiums may be contributory, or non-contributory. That is, employers may pay only part of the cost and share the remaining expense with employees, or they may pay all the cost.

Cuba is one example of a major sugar area in which group insurance is widely used. Many companies, such as the Antilla Sugar Estates, Cia.; Azucarera Yateras, Cia.; Azucarera Maceo; Centrals San Isidro and Resulta; Central Romelie; some mills of the Atlantica del Golfo and Falla-Batista groups; and many others, now have some form of group protection plan.

Luis Beguiristain, vice president of San Isidro and Resulta mills, says, group insurance is the "very best protection for sugarmen's families . . . aids public relations."

Pedro Legañoa, treasurer of Cia Azucarera Maceo, comments that this type of insurance, "saves the management expenses when they can least be afforded."

Last year the Australian sugar industry also moved further into the group insurance field. They used a slightly different plan and established accident and sickness insurance for independent growers through the Queensland Council of Agriculture. So, it is possible for non-employees also to enter into group insurance plans.

Group insurance provides the least expensive means of protection for a number of people. And, there are many advantages that recommend consideration of this type of benefit by all sugar operators.

After a long period of hostility toward bulk sugar handling in Cuba, employee organizations are now cooperating with employer groups in the introduction of bulk sugar terminals. A new modern bulk handling terminal is being erected at Matanzas Bay. To date only bagged sugar is being fed into the ships' holds. Later, modern bulk handling equipment is contemplated.

In Australia, the State Industrial Court of Queensland did not increase the basic wage rate for the last quarter of 1957 in view of the small variation in the cost of living figures. The basic wage is 12 Pounds, 1 Shilling, per week (about $25 U. S.).

Hawaii reports that the annual sugar output per worker has increased from about 2½ tons in 1872 to almost 75 tons in 1956.

Prior to World War II income and employment from sugar, pineapples, and other

(*Continued on page* 45)

Sparkler Filters at Betteravia

Semiautomatic Filtration of Standard Beet Liquors

By M. A. Woods

Factory Superintendent, Union Sugar Division, Consolidated Foods Corp.

Union Sugar Division's beet factory at Betteravia in California has two campaigns yearly; one in the *early summer* using beets shipped in from the fabulous *Imperial Valley*, the other in the conventional *fall* using beets from the *coastal area* of the state. As part of a program of improvement and modernization, the company installed a battery of five semiautomatic filters manufactured by the Sparkler Manufacturing Company and designated as type RSC filters. The installation and performance of this important equipment is described herewith in an article which follows the paper presented by Mr. Woods at the Tenth General Meeting of the American Society of Sugar Beet Technologists in Detroit on February 4th.—*Editor.*

A major effort has been exerted during the past few years on the part of both the equipment manufacturer and the sugar processor to replace the sturdy, but labor consuming plate and frame filter presses by a design of filter that would accomplish the same purpose and require less manual labor. The equipment suggested ranges from complicated, completely automatic devices through various partly controlled units to some that have more objectionable features labor wise than the original filters they were intended to replace.

After trying several types of internal sluicing filters, a type RSC Sparkler filter was placed on trial early in 1956.

Experimental results obtained with this filter using dynel cloth covered plates showed that flow rates up to 12.5 gallons per square foot per hour could be relied upon and that the flow through the filter could vary widely without effecting the juice clarity or the length of the filter cycle to any great extent.

The ease in handling the filter, coupled with this ability to withstand load changes, were ample proof that the filter could easily be automatically controlled and thereby the labor required could be reduced to a single operator.

Five, 300 square foot units were selected to handle the juice flow using a safe design factor of about seven gallons per square foot of filtering area per hour. Smaller units, rather than large ones, were chosen to lighten the handling of the filter leaves and to provide maximum flexibility of operation.

The units fitted nicely into the area available with ample working space remaining in contrast to the former crowded condition due to the larger space requirements of the plate and frame presses. The increased working space between the presses and the easier operating conditions greatly reduced the sanitation problem and lessened the safety hazards due to slippery, wet, congested floors.

The installation consisted of five Sparkler RSC filters, completely self-contained, internally sluiced units which are operated entirely closed except when changing or replacing filter leaves. A mixing screw in the bottom of the filters allows the cake to be withdrawn and fed by gravity back to the process at the end of the cycle without opening up the filter.

The flow from each filter leaf is individually equipped with a sight glass and valve so that if one leaf is out of action, flow from that leaf is stopped and the filter does not have to be taken out of action.

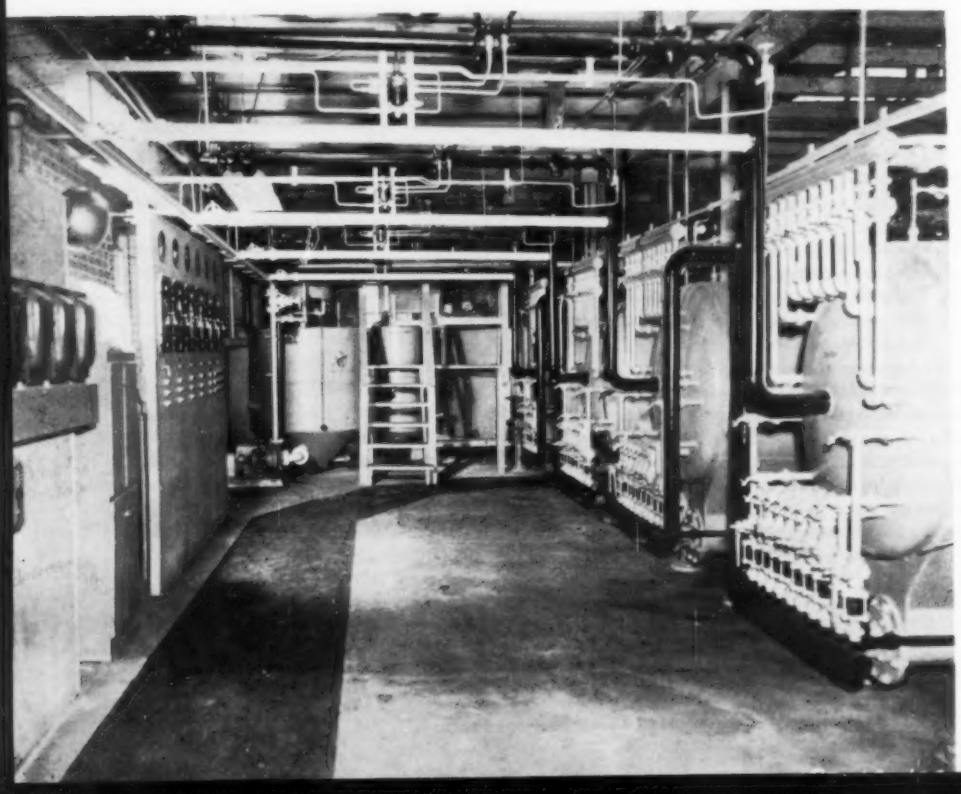
A central instrument panel was used to control automatically the flow to the filters from one point. This instrument design was based on the following operational points:

1. To operate any one or all the filters in accordance with the incoming juice flow.
2. When the filters are thus operating to restrict the maximum flow per filter to any given amount.
3. To be able to operate any one filter or all filters at any constant flow rate desired.
4. To make the instrumentation as simple and fool proof as possible from the operators standpoint.

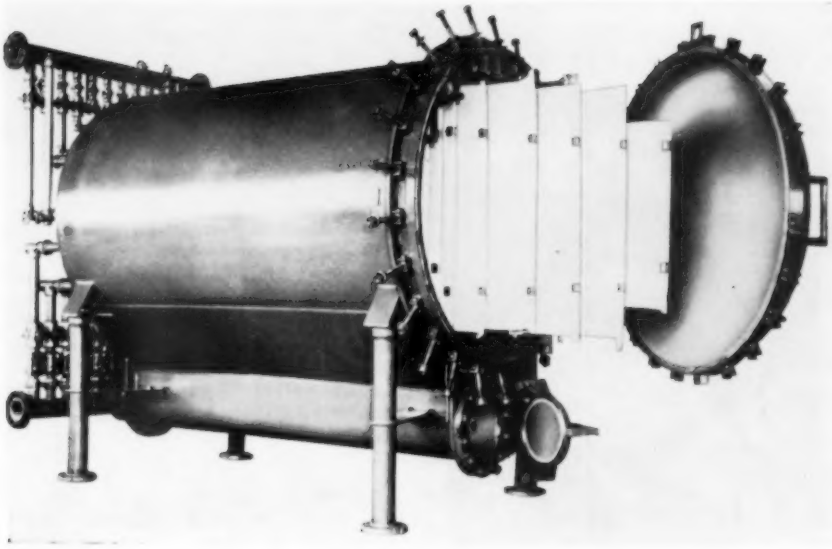
These objectives were accomplished by air actuated instruments. These instruments record the level in the incoming juice surge tank and transmit a control air signal in proportion to this tank level to the air operated flow controllers on the central panel for each individual filter. This control is by-passed when the filter is placed on a constant flow rate.

With the central controller placed on "Automatic", the flow to the filter varies in proportion to the juice flow to the station. Placing the control on "Set flow", a constant flow rate is maintained. Any of the filters can be operated from this central point under either flow control condition.

All other operations are done manually and require no great physical effort on the part of the operator. This man is utilized in place of considerable instrumentation plus the initial headaches of getting such an automatic system into full, trouble free operation. The present system offers lower initial cost and lower maintenance than would be required for fully automatic equipment at little or no sacrifice of man hours. For as important an operation as filtering standard liquor, even with a fully automatic control system it would still be desirable to have one man present to monitor the operation, to make sure "All is well" and to be quickly available in case of trouble.



The installation at Betteravia shows four of the five filters with pipes for individual plate wash off spray at top and individual plate outlet control valves with sight glasses at bottom. At left may be seen the control panel; in background, the precoat and supply tanks.



Five 300 sq. ft. Sparkler RSC units, as shown, are operated at Betteravia by one man due to ease of handling. Plates can be removed individually and replaced with pull-out roller carriage slides. A regular weekly schedule for changing Dynel filter cloths was adopted.

Results obtained by summarizing the data recorded on the flow rate charts are given in table 1. An average flow rate of better than eight gallons per square foot per hour was maintained throughout both operating seasons. Periodic flows up to 15 gallons per square foot per hour were obtained with no great sacrifice of filter cycle length. There was sufficient reserve flow capacity at all times to permit a greater than average flow when required.

During the first month of operation the filters were changed on a set schedule of two filters per shift which accounts for the short cycle length. This procedure was gradually relaxed as the operators were broken in and the procedure of changing filters after they had reached an operating pressure of 40 pounds P.S.I.G. was adopted.

Clarity filter pads were checked at the station before the filters were placed "on stream" and periodic composite checks of the filtering efficiency taken every hour using both black and white filter pads. Samples were also composited by the central laboratory hourly and results posted every four hours.

This system of checking performance was set up in lieu of double filtration and thus far has proven very successful. No difficulty has been experienced in maintaining peak filtering efficiency.

The variations in syrup flow to the station was leveled by placing the three filters in service longest, on a set flow rate and allowing the two newest filters to handle the flow changes. This procedure did not materially shorten the filtering cycle or reduce the filtering efficiency.

Sluicing at the end of the cycle was accomplished by first sluicing the filter with approximately 900 gallons of thin juice. This thin juice, together with the mud, was returned by gravity to first carbonation. The filters and lines were then rinsed with a small amount of water, the drain valves changed, and the filter cloths flushed to the sewer with hot water. This latter procedure greatly facilitates keeping the cloths clean and in good filtering condition.

A regular procedure of changing and washing the cloths once a week was adopted. An extra set of filter leaves was purchased for this purpose. This maintained "new cloth" filtering conditions at all times.

Style 901 F Dynel filter cloth, manufactured by the U. S. Rubber Company, was used during both seasons. One set of special heat treated nylon cloths of the same cloth weight and weave was used with equally good results. All the cloths were made up at Betteravia, using ordinary glazed cotton thread.

The cloth life to date averages more than 100 days. Two and one-half complete sets of cloths for the filters were made up and used during the two seasons. One and one-half sets remain for further use next year after 185 operating days.

Wire mesh screen filters were tried during the *Imperial Season* on one filter. Owing to the fact we precoat with a small amount of solka floc mixed with filter aid, this filter had to be run at a constant rate to prevent losing the filter cake. Rather than substitute asbestos for the solka floc, which aids the cleaning operation and shortens the precoat time, the use of screens was abandoned in favor of the less expensive cloth. The wire cloth tried was a 60 x 60 square mesh stainless steel wire backing screen. No difficulties due to blinding were encountered during the approximately 60 day period the screens were used.

Summary and Conclusions

The comparative operating costs for 1956 and 1957 are summarized in Table 2. Examination of these results show an eighty percent reduction in cloth costs and a fifty percent reduction in labor costs per ton of beets. These results combined total a 56 percent reduction in cost per ton of beets when figured on the same basis of labor costs.

The material cost of the completely installed filters amounted to $8,436.36 per filter including instrumentation, piping, and extra sluice pump costs.

On the basis of actual labor and material cost savings effected during the past year, the reductions in cost will pay for this equipment in slightly more than 6½ years. Rising costs and labor will shorten this period.

Summarizing the results obtained, a combination of equipment and instrument con-

(*Continued on page* 45)

TABLE I. Summary of Filter Performance for Five 300-Square Foot Filters. (Filtering 68-70 Brix Standard Liquor)

Month	*Avg. No. of Cycles per Filter*	*Avg. Length of Cycle*	*Avg. Output G. P. M.*	*Avg. Total Gals. per Cycle*	*Avg. Flow Gals. per Ft.² per Hour*
June	51	11.4 hrs.	46.2	31,573	9.2
July	24	18.24 hrs.	40.4	44,238	8.1
August	23	17.9 hrs.	43.4	46,616	8.7
September	30	19.8 hrs.	41.5	49,259	8.3
October	25	20.13 hrs.	38.4	46,394	7.7
November	11	23.13 hrs.	40.7	56,468	8.1
Average for Imperial Season		14.82 hrs.	42.6	37,905	8.5
Average for Coastal Season		20.22 hrs.	41.0	49,684	8.2

TABLE II. Comparative Material Use and Costs 1956-1957. Plate and Frame vs. Sparkler Filters. (Filtering 68-70 Brix Standard Liquor)

	1956	*1957*	*Reduction*	*Cost per Ton of Beets 1956*	*Cost per Ton of Beets 1957*
Cloth Used	3305 yds.	450 yds.	2855 yds.		
Cloth Cost	$ 2,886.68	$ 712.71	$2,173.97	0.59¢	0.11¢
Labor Used	$12,821.76	$7,857.07*	$4,964.69	2.6¢	1.3¢*
Total	$15,708.44	$8,569.78	$7,138.66	3.2¢	1.4¢

* 1956 Wage Scale.

Personal press station

Dr. W. Ralph Singleton, director of the Blandy Experimental Farm of Boyce, Virginia, and biology professor at the University of Virginia, addressed the general session of the American Society of Sugar Beet Technologists at the Tenth General Meeting in Detroit on February 4th. His subject was, "Radiation as Related to Genetic Improvement of Crop Plants."

The establishment of a museum foundation was announced recently by the Havana offices of **Julio Lobo,** a leading Cuban sugar mill owner and broker. Sr. Lobo is reputed to have one of the best collections this side of the Atlantic of art masterpieces and manuscripts of the Napleonic era. These will form part of the museum, together with his large library of books dealing with the Cuban sugar industry. Plans have already been drawn up for the construction of a building to house this collection.

Dr. W. Ralph Singleton

Presiding over the inaugural session of the XXXI Annual Conference of the Association of Sugar Technologists of Cuba are (l. to r.): Constantino Leon, President, National Federation of University Graduates; José Perez San Juan, President, Association of Cane Planters of Cuba; Rodolfo Arango, representing the Association of American Writers and Artists; Jorge Tarafa, Secretary, Association of Sugar Technologists of Cuba; Minister of Agriculture Fidel Barreto; Francisco Santa Maria, President, Association of Sugar Technologists of Cuba; Emiliano Ramos, Technical Director, Cuban Institute of Technological Research; Col. Mario Menendez Dominguez, representing the President of the Republic; Salustiano Garcia, President, Sugar Mill Owners Association of Cuba.

B. W. Dyer & Company, sugar economists and brokers, made known the appointment of **Roy M. Schwartz** as assistant manager of the Refined Sugar Department and the addition to that department of **Roy A. Friedley.** Mr. Schwartz has spent all of his business career in the sugar industry and was formerly associated with American Molasses Company. Mr. Friedley was previously with H. H. Pike & Co. and with National Sugar Refining.

William D. Lamborn, vice president of Lamborn & Company, sugar brokers, and a partner of Lamborn Craig & Company, was elected president of the National Sugar Brokers Association at the annual meeting, January 14, 1958. He succeeds Emil J. Hirtzel.

Guillermo E. Ochoa has been elected president of the Asociación de Técnicos Azucareros de Cuba for 1958. Other officers of the Executive Committee of the Association are: Senén Viego Delgado, first vice president; Harry F. Pearson, second vice president; Angel Ramón Ruiz, third vice president; Jorge C. Tarafa, secretary general; Tomas Fandiño López, assistant secretary; Issel L. Puig, treasurer; Joaquin Martinez-Mestre, assistant treasurer; Dr. Jorge Ramos Muñoz, corresponding secretary; and Rogelio Ramos Grau, director general.

Charles S. Lowry has been elected president of the New York Coffee & Sugar Exchange to succeed Leon Israel Jr. who will continue as a member of the Board. Mr. Lowry has been a member of the Exchange for 10 years and is president of Lowry & Company, sugar brokers and factors of 99 Wall Street, New York City. He is also a director of South Porto Rico Sugar Company.

Charles B. Broeg has been appointed head of New Products Planning Department of the American Molasses Company, it was announced by President Frank C. Staples. Mr. Broeg was formerly Sugar Technologist for the Sugar Division, Commodity Stabilization Service, U. S. Department of Agriculture.

F. Shelton Farr of Farr & Company, Inc. has been re-appointed chairman of the Sugar Division of the New York City Cancer Committee's 1958 Crusade. The New York City Cancer Committee is the local division of the American Cancer Society and seeks as its goal $1,616,000 of the Society's nationwide drive for $30 million for cancer research, education and service.

facts about sugar

FEBRUARY 3, 1958:—Cuban rebels used planes to burn some cane fields in Camaguay province, according to reports received by B. W. Dyer & Co., Sugar Economists & Brokers. Thus, it now appears that the destruction, which previously had been confined largely to Oriente province, has been extended.

Heavy rainfall in some areas of Cuba, prior to that time, had dispelled fears of further burning, although it temporarily halted some mills from grinding. A Presidential Decree on January 10th restricted 1958 Cuban production to 5,500,000 Spanish long tons, (6,247,018 short tons) and allotted it into the following quotas:—U. S. Free 2,127,041 short tons; U. S. Retained 567,911 short tons; Other Countries Free 1,703,732; Stabilization Institute Sales 958,349; Other Countries Voluntary Reserve 283,030; Other Countries Obligatory Reserve 266,208; Local Consumption 340,746 short tons.

The Cuban carryover at the end of 1957 was estimated to be about 640,000 Spanish long tons (726,926 short tons). This is almost equal to the 396,000 ton Financed Reserve plus the 340,000 short tons of additional reserves for the U. S. set aside in the early fall of 1957.

The U. S. Department of Agriculture estimates that, after restricting the crop to 6,247,018 short tons, Cuba will have the cane equivalent of about 900,000 short tons of sugar available for the production of hi-test (invert) molasses. No hi-test was produced during 1956-57 because of the strong demand for Cuban sugar.

World sugar prices declined from 3.85¢ per pound on January 2nd to 3.70¢ on January 17th. The Cuban Sugar Institute sold Russia 100,000 tons of raws for February/March/April shipment at 3.65¢ f.a.s. It was also reported that Russia was seeking an additional 100,000 tons, which if purchased from Cuba, would reduce the price of both lots to 3.63¢. The below-market price dampened some of the enthusiasm created by Russia's entry into the market.

Western European sugar production for 1957/58, as estimated by F. O. Licht, was raised to 8,255,384 short tons raw value, compared with the previous estimate of 8,138,033 short tons and 7,626,064 last season. Eastern Europe was increased to 9,255,762 short tons against 9,132,648 previously and 8,186,011 in 1956/57.

U. S. spot raw sugar prices advanced to $5.70 per 100 pounds on January 21st, but later in the month declined to $5.65. Refined sugar prices remained at $9.15 per 100 pounds in the Northeast, but in the Chicago-west territory, effective January 13th, a $.30 allowance was added to the existing $.10 direct shipment allowance, making the invoice price $8.10 less 2%. Cane refiners made allowances of $.20 and $.10, making their basis price $8.40 in that territory.

Refined sugar deliveries in 1957 totalled 8,709,000 short tons, raw value, according to a preliminary estimate by the U. S. Department of Agriculture. This was 212,000 tons less than sugar charged to quotas (entered or marketed) during the calendar year. Quota stocks of sugar held by refiners and importers apparently increased by about 150,000 tons during the year.

Beet sugar production in 1957 was estimated at 2,057,000 short tons, or 68,000 tons above the previous record in 1954. Distribution was reported at 2,066,000 tons, or 84,000 tons higher than the record year 1956.

Refined sugar distribution through January 25, 1958 amounted to 430,000 short tons compared with 437,000 tons during the similar period last year. The slower rate of deliveries this year is logical because it is estimated that "constructive" or "in transit" deliveries at the end of 1957 amounted to as much as 150,000 tons, B. W. Dyer & Company concludes.

Sugar Prices January 31, 1958

Ex Duty Raw Sugar New York	**5.65**
Average No. 6 Raw Sugar January 2-January 31	**5.65**
Refined Sugar Gross, N. Y.	**9.15**
No. 4 Raw Sugar (f.o.b.) Cuba	**3.67**
Average No. 4 Sugar January 2-January 31	**3.74**

Futures Prices	*Contract #6*	*Contract #4*
March 1958	**5.62**	**3.66**
May 1958	**5.65**	**3.67**
July 1958	**5.73**	**3.67**
September 1958	**5.75**	**3.67**
October 1958	**—**	**3.64**
November 1958	**5.76**	**—**

Strike in Hawaii

U. S. production and distribution of sugar may be effected by a complete shutdown of the Hawaiian industry on February 1 as a result of a strike by the International Longshoremen's and Warehousemen's Union.

Of the 27 plantations all but one (it has no mill) have labor contracts with the union, which is headed by Harry Bridges. Negotiations for a new contract to replace the agreement that expired January 31 bogged down over union demands for a 25¢ per hour wage increase plus automatic promotions to certain grades.

Just before the strike deadline the union said they would take something less than 25¢ and the companies offered 4¢ per hour. This was rejected by union leaders and a vote of the workers.

The young and energetic new Governor of Hawaii immediately called in two Federal mediators who started talks with both sides. It is evident that strong pressure will be put on both union and management to get down to serious bargaining, which had not been evident up to the time of the strike.

A unique feature of the strike, which started off as one of the most "peaceful" in history, was the union's offer to consider keeping skeleton crews on the job to keep the cane alive. (Over half of Hawaii's production comes from land that depends heavily on irrigation.) However, they required in return agreement from management that they would make no effort to harvest cane until a contract agreement was reached. This issue was still unsettled at the time the mediators arrived and shut the door to any information as to progress in talks.

The strike had little immediate impact as only 12 of the 27 plantations had started grinding in 1958. They had produced less than 10,000 tons of sugar. However, public fear stems from memories of the 75-day strike by the same union in 1946 which cost the Islands millions of dollars and resulted in several marginal plantations going out of business. There are now other plantations in the marginal classification that may find it necessary to fold if the present strike is a long one.

Hilo Sugar Company, on the Island of Hawaii, installed a battery of six new low grade centrifugals, at a cost of $135,000, during the year-end off season. Other improvements included the retubing and rewalling of a boiler and replacement of six mill rollers, at a cost of $12,000.

A new machine for planting and replanting in wet, swampy areas and to operate on steep slopes has been developed for Hutchinson Sugar Co. on the Island of Hawaii. The basic unit is a crawler tractor with extra long and wide tracks for flotation. The plows are actuated by low pressure hydraulics so they will slide up and over stones. Tilting seed bins allow workers on the unit to bring

seed within their reach without stopping. Operation is by a driver located over the tractor radiator, to improve vision.

The unit, which was built by A. D. Stubenberg in Honolulu for some $18,000 (including the tractor), has hydraulically controlled furrow plows and covering devices and equipment for applying liquid fertilizer. The fertilizer unit applies any liquid plant food in either the plant crop or replant furrow, or in a band along side of the cane row. The tractor carries two tons of seed and 240 gallons of liquid fertilizer.

Recent increases in water freight rates in the Pacific will cost the Hawaiian sugar industry about $1 million more in 1958 than in the previous year. An eight to nine percent hike early this year boosted sugar rates from $9.79 to $10.66 per ton from Hawaii to the West-Coast U. S. Molasses freight jumped from $4.64 to $5.05 per ton.

An experimental machine has been developed by engineers of the Experiment Station of the Hawaiian Sugar Planters' Assn. to pickup cane left behind in the field after being mechanically harvested.

The machine, which is called a "liliko" (small cane in Hawaiian language) pickup unit, is able to clean up about 95 per cent of cane left on the ground. It covers an area 10 feet wide, and does about an acre an hour.

Pickup is accomplished by 10 star wheels 42 inches in diameter, which are spaced 12 inches apart and independently oscillated. The cane pieces are speared by or wedged between the V-shaped teeth, and are stripped off at the top by deflector plates. The cane pieces are elevated by a conveyor into a bin which can be unloaded from either side.

The unit is a semi-trailer-type and is used with a TD9 or D4 tractor.

The liliko cutter-windrower is designed to cope with problems peculiar to grab-harvesting. This is a mechanical use of heavy duty motorized crane, equipped with a specially designed cane grab, for purposes of commercial harvesting in Hawaii. Most of the cane left in the field following this operation is attached to stools, and ranges in length from one to five feet.

The machine has undergone successful tests at the Hawaiian Commercial & Sugar Co. on Maui and on several plantations on the Island of Hawaii.

Ideas on the drawing board for modification include: additional pickup tines; substitution of 60x42 Rolligon for 18:00x24 tire on outboard wheel; addition of free-cutting side knife; installation of a conveyor-chain-driven ground knife which would allow a full-length center conveyor chain; a means to shunt cane lost through desoil gaps into standing cane; and addition of a drum-type pickup reel.

Puerto Rico Commission visits Florida

A Legislative Commission composed of senators Ernesto Carrasquillo and Heraclio Rivera and representatives Mario Canales and Juan Fuentes Leduc, has visited the U. S. Sugar Corporation of Clewiston and Central Okeelanta, both in Florida, for the purpose of observing the progress achieved in field operations, cultivation, cutting cane, loading and hauling to the sugar mill. This Commission has been gathering information from various sources in order to make a complete study of the various problems affecting the sugarcane industry in Puerto Rico. It is expected that the visit of this commission to the prosperous sugarcane areas of Florida will offer additional information for making a comparative and more comprehensive study of the situation of the sugarcane industry of the island in order to propose adequate legislative measures. During this trip the Commission was accompanied by Dudley Smith and J. M. Guzmán, vice president and secretary of the Sugar Producers Association of Puerto Rico, respectively, and by various sugarcane technologists.

The U. S. Department of Agriculture announced preliminary 1958 processor allotments totalling 130,016 short tons, raw value, restricting the amount of Puerto Rican sugar that may be brought to the United States for direct consumption. These allotments were distributed as follows:

	Short tons, raw value
Central Aguirre Sugar Co.	6,792
Central Roig Refining Co.	19,828
Central San Francisco	1,393
Porto Rican American Sugar Refinery	79,716
South Porto Rico Sugar Co. of P. R.	1,737
Western Sugar Refining Co.	20,350
All Other Persons	200
Total	130,016

Up to January 26, 1958 ten sugar centrals had started grinding operations in Puerto Rico. To-date these centrals had processed 166,893 tons of sugarcane with a production of 17,393 tons of sugar and an average yield of 10.422 per cent of sugar. Several sugar centrals have decided this year to start late with the objective of getting higher yields.

The Association at its ordinary meeting of the Board of Directors held in January unanimously reelected Manuel A. del Valle and Eugene F. Rice as president and vice president, respectively.

Rear view of newly developed experimental "liliko" pickup unit, showing ten star wheels that oscillate independently, throwing short pieces of cane on to conveyor. The machine is described in the accompanying notes on Hawaii.

Indian Sugar to U.S.?

With sugar production in India running at a high rate far in excess of domestic needs, and in keeping with the Government's policy of permitting exports of as much sugar as possible, the need for building up a remunerative export market for Indian sugar is more and more realized.

For the crop year 1956-57 the Indian Sugar Mills' Association (Calcutta) acted as the sole exporting agency, selling about 153,000 tons, out of which about 146,000 tons were shipped before the end of 1957. The Government of India has not fixed any export target for the 1957-58 output, nor has it decided on the agency or arrangement through which sugar exports will be regulated in future.

Some prominence has been given to local discussions regarding the possibility of Indian sugar entering the United States market. While advantages are apparent from the Indian point of view, two major obstacles probably will prove insurmount-

able. First, India exports refined only while the United States imports only limited amounts of refined and currently would be loath to increase refined imports. Secondly, the price would be far higher than is being paid by the U. S. for raws. North Indian f.o.b. factory prices work out to $135 per short ton; landed in the U. S. this would amount to $152.

A comprehensive survey of the progress of sugar industry in India during an 18-year period to June 1955 reveals that the rate of development of the industry was more than twice as rapid in South India as in North India, the share of production of the Southern factories improving within the period from 17 percent to 30 percent of the over-all. The tropical South is climatically better suited to cane cultivation than the sub-tropical North, and with the development of irrigation facilities—which was delayed in the South for a time owing to its hilly terrain—the great majority of new sugar mills are being projected in the South. Financial results confirm the locational advantage of the South, the index of return on capital represented by the ratio of profits after depreciation and tax to net worth (paid-up capital plus free reserves) being for the period as a whole 11.4 percent for South India, against 7.6 percent for North India.

The study covers financial trends in the industry and is based on the working of 110 companies representing more than 70 percent of the installed capacity of the Indian sugar industry. The gross assets of the companies increased during the period by about $206 million, i.e. from $42.1 million to $248 million, of which fixed assets accounted for $84 million.

According to the study, the limiting factor on return on capital is not production technique but the difficulty of finding adequate supplies of ripe fresh-cut cane, and of transporting it over longer distances to the detriment of its sucrose contents occurring through rapid drying out, especially during the hot months.

The American Society of Sugar Beet Technologists concluded its 10th General Meeting in Detroit on February 6th. The attendance was estimated at 355 members. Pictured above, left to right, is Austin Armer, agricultural engineer, outgoing president of ASSBT, his successor Harvey P. H. Johnson, general agriculturist of American Crystal, Vernal Jensen, director of agricultural research for Amalgamated, newly elected vice president, and James H. Fischer of Fort Collins, Colorado who was re-elected secretary treasurer.

Sale of Hershey Group in Cuba

The new year was ushered in with the best of prospects for the Cuban sugar industry. Optimistic forecasts for the 1958 Campaign were made by industry spokesmen as well as representatives of the government, despite disturbances which have been caused by the unstable political situation. The Campaign for 1958 commenced on December 5th, the government having authorized this early date by Law—Decree of December 7th. The Niquero mill in the province of Oriente was the first to begin grinding.

The main topic of conversation in Havana sugar circles has been the two large operations with which the Cuban sugar industry welcomed the new year.

By far the most important of the two, was the approval by the Board of Directors of the Cuban Atlantic Sugar Co. of the sale of several of the companies subsidiaries known as the Hershey group of properties. The buyer is the Chiriqui Mills Corporation, at a reported price of $25,500,000 consisting of cash and short term notes.

The Board adopted a resolution asking stockholders approval for the sale and a plan of complete liquidation of the company. If sale and liquidation are approved, the stockholders will receive a distribution of the proceeds of the Hershey sale, other cash and securities, and stock of the Compañia Azucarera Atlantica del Golfo.

Among the Hershey properties are three raw sugar mills, the largest sugar refinery in Cuba, a peanut oil plant, and a henequen plant.

The other transaction was the reported purchase of definite control of the Guantanamo Sugar Company by Cuban interests. This Company includes the Soledad, Isabel and Los Caños mills.

Having these mills pass under Cuban control has been received very favorably in Havana sugar circles.

A Law-Decree has been issued directing the Ministry of Labor to set up a commission to be called "Comision de Superproduction Azucarera para la zafra de 1958" to oversee any difficulties that might arise in the different sugar mills and to be formed by three delegates designated by the Hacendado Association, and three designated by the Executive Board of the Federation of sugar workers.

Mr. Fidel Barreto, the Cuban Minister of Hacienda, has authorized some mills to delay grinding operations until January 31st and others to delay until February 15th. They are the following mills:

January 31st—El Pilar, Josefina, Rosario, San Antonio, Santa Amalia, San Ignacio, Tinguaro, Caracas, Fidencia, San Agustin, R. San Jose, Nela, Purio Resolucion, Santa Isabel, Perseverancia, Escambray, Cespedes, Patria, Santa Cecilia, Baltony, Isabel C, Los Caños, Mabay, Baguanos & Tacajo.

February 15th—Habana, Limones, Carolina, Corazon de Jesus, Ulacia, Unidad Constancia, Victoria, Cunagua, Jaronu, Senado, Najasa, Boston, Preston, Chaparra & Delicias.

The BAINFAIC (Banco de Fomento Agricola e Industrial de Cuba) has made a loan to a Cuban shipping concern "Compañia de Transporte Mar Caribe S.A." to enable them to purchase a 2,047 ton tanker that will be dedicated to the transportation of molasses from Cuba to the United States and Canada. It is the fourth such ship which has been purchased by this firm. The loan amounted to $500,000.00.

International Commission for Uniform Methods of *Sugar Analysis*

The meeting of the 12th Session is to be held at the National Bureau of Standards and the Hotel Shoreham, Washington D. C., U. S. A. from 2nd to 6th June, 1958.

The Agenda of the 12th Session lists 29 subjects as follows:

Title	Referee	Country
Constitution and by-laws.	H. C.S. de Whalley	(Great Britain)
Weighing, taring, sampling and classification of sugars.	A. E. Tate	(Great Britain)
Conductometric and gravimetric ash.	K. Sandera	(Czechoslovakia)
Determination of reducing sugars in sugar products other than molasses and refined sugars.	E. J. McDonald	(United States of America)
Decolorising tests for bone charcoal.	E. P. Barrett	(United States of America)
Sucrose and reducing sugars in molasses.	C. H. Allen	(Great Britain)
Tables of refractive indices of sugar solutions.	C. F. Snyder	(United States of America)
Quartz control plates.	E. Einsporn	(Germany)
Tests for evaluation of the refining qualities of beet sugar.	P. Devillers	(France)
Tests for the evaluation of refining qualities of cane sugar.	C. W. Davis	(Australia)
Specifications and tolerance of pure sucrose and reagents.	J. Henry	(Belgium)
Tests for the evaluation of the crystallising qualities of refinery liquors.	A. van Hook	(United States of America)
Colour and turbidity of sugar products and reflectance of solids sugars.	T. R. Gillett	(United States of America)
Values of the Clerget divisor and methods for multiple polarisation for sucrose and raffinose.	J. Dubourg	(France)
Dry substance (Total solids) in sugars products by drying, refractive index and other methods.	S. D. Gardiner	(Great Britain)
pH.	D. Gross	(Great Britain)
Analysis and evaluation of refined sugars.	G. P. Meade	(United States of America)
Design and standardisation of laboratory apparatus.	J. Ancizar-Sordo	(Columbia)
Lead error in raw sugar polarisation.	J. G. N. Gaskin	(Great Britain)
Raffinose, other oligosaccharides and glycosides.	A. Carruthers	(Great Britain)
Determination of sugars in sugar beets.	H. Hirschmuller	(Germany)
Determination of factors causing deterioration of raw and refined sugars in storage and transport.	H. E. C. Powers	(Great Britain)
Inorganic constituents of sugars and sugar products.	R. Saunier	(France)
Starch Hydrolysis products.	K. Heyns	(Germany)
Organic constituents of sugars and sugar products.	P. Honig	(United States of America)
Microbiological counts in raw and refined cane sugars.	I. R. Sherwood	(Australia)
Microbiological counts in raw and refined beet sugars.	R. Weidenhagen	(Germany)

The British West Indies has just formed a National Committee which brings the total of affiliated Committees to fifteen. At least nine others are in the process of formation.

Delegates do not require a formal invitation, but their respective National Committees should advise the Hon. Secretary of the names of the delegates chosen to attend the Session.

Persons not representing a National Committee and wishing to attend the Session as observers are requested to contact the Hon. Secretary as soon as possible to obtain formal approval for attendance.

No restrictions are imposed with respect to country of origin or size of sugar industry, but the limited space of the meeting rooms makes it necessary to limit the number of admitted observers. As previously announced, delegates and observers are to make their own arrangements with regard to travelling and accommodation and are strongly advised to do so without further delay. A list of suitable hotels is, however, available on request from the Hon. Secretary, Dr. D. Gross, Tate & Lyle Research Laboratories, Keston, Kent, England, or from the Hon. Organiser Mr. C. F. Snyder, National Bureau of Standards, Washington, D. C., U. S. A.

From information already to hand, it appears that a fairly large number of delegates and observers from various European countries will be present. The session will thus provide a meeting and discussion place for most of the outstanding sugar chemists and experts of the world, with a scientific agenda surpassing even the ambitious programme of the last, 11th Session at Paris, 1954, the Proceedings of which are still available from the Hon. Secretary or Dr. H. B. Hass, Sugar Research Foundation, Inc., 52 Wall Street, New York 5, N. Y., U. S. A. (Price £1. —or $3.00 incl. postage).

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SUGAR ABSTRACTS

Published under the Auspices of the International Society of Sugar Cane Technologists by Special Arrangement with SUGAR y AZÚCAR — Dr. O. W. Willcox, Editor

Agriculture

More Study of the Effects of Gibberellic Acid upon Sugar Cane

R. E. COLEMAN, *Sugar Bulletin*, Vol. 36, No. 2, pp. 24-26 (1957).

One-eye seed pieces were soaked five hours in solutions containing 5—10 ppm. of gibberellic acid and planted in pots. Varieties treated were C.P. 44—101 and 44—155. For the period up to 23 days the treated C.P. 44—101 plants increased in height at a rate 56% faster than the control plants; by the 47th day there was little difference. Then these plants were sprayed with a 10% ppm. solution which resulted in an increase in rate of growth over the controls, but 21 days later the rates of growth were again about the same. Subsequent sprayings produced plants 60% taller. Up to 112 days there were no significant differences in heights. With C.P. 44—155, there was a significant difference in fresh weight; the repeated sprayings increased both weight and height. Further work in field tests will include the varietal effect on maturity, juice analysis, and sugar yield.

■

New Approach to Rat Control

Report Experiment Station Committee, Hawaiian Sugar Planters' Association, p. 39-40 (1957).

In a continuing struggle against the four species of rats infesting cane, a number of new poisons and baits have been employed. The most promising to date is a combination of corn (maize) as the carrier and the well-tried thallous sulfate (Tl_2SO_4) as the poison. The corn grains are soaked or boiled in a solution of thallous sulfate of a strength such that one to four grains of corn will be enough to kill a rat; the corn is then treated with a 0.1% solution of sodium benzoate (to prevent moulding). After one or two pre-baitings at seven-day intervals the still-moist poisoned corn is spread over strips 10 to 20 feet wide at a rate of approximately 430 lbs./acre. Preliminary tests have shown that this bait can be extremely effective in reducing the percentage of rat infestation. The rats accept it as readily as they do rolled oats, and it has the advantage of relatively low cost.

■

High Sugar Content or More Tons of Sugar per Acre?

NORMAN J. KING, *Cane Growers' Quarterly Bulletin*, October, p. 66 (1957).

The question as to whether a new cane variety with high content of commercial cane sugar (c.c.s.) is more valuable than an older one with lower c.c.s. but with more cane weight is not generally well understood. A prevalent opinion is that the lower c.c.s. cane gives more tons of sugar per acre.

Tons of sugar per acre is not a true measure of profit unless other items such as harvesting costs, transport, etc., are taken into consideration. Similarly c.c.s. of cane is not a true criterion unless it is considered in relation to size of crop and the relevant costs of cutting and transport. The accompanying table shows cane tonnage and varying contents of c.c.s., the calculated value of the cane, the cost of harvesting at a fixed rate per ton, and the net return to the grower, provided that there was no extra cost for hauling to the mill.

It can be seen from Table I that if a grower harvested a block of Q.50 which yielded 28.57 tons of cane at 14 c.c.s. and he then harvested a block of Q.57 yielding 25.81 tons at 15.5 c.c.s., the second block would have been more profitable by £6/7/4 per acre. Yet both blocks would have produced exactly four tons of c.c.s. per acre. If that grower had a haulage charge of 4/- per ton to pay, the block of Q.57 would have been more profitable by £6/18/4 per acre.

If one takes the two extremes of the table, 33.3 tons of cane at 12 c.c.s. and 25 tons of cane at 16 c.c.s., both would amount to four tons of c.c.s. per acre but the 25-ton crop would give a net return to the grower £19/1/11 per acre higher.

Table I. Net return from 1 acre of cane at varying c.c.s.

Tons cane required to make 4 tons of c.c.s.	Value of cane with sugar @ £47 per ton	Harvesting cost @ 15/5 per ton cane	Net return per acre
33.3 @ 12 c.c.s.	£118 6 10	£25 12 10	£ 92 14 0
32 @ 12.5 c.c.s.	120 7 9	24 13 4	95 14 5
30.77 @ 13 c.c.s.	122 5 5	23 14 4	98 11 1
29.63 @ 13.5 c.c.s.	124 0 2	22 16 10	101 3 4
28.57 @ 14 c.c.s.	125 12 3	22 0 5	103 11 10
27.59 @ 14.5 c.c.s.	127 2 9	21 5 4	105 17 5
26.66 @ 15 c.c.s.	128 9 10	20 11 0	107 18 10
25.81 @ 15.5 c.c.s.	129 17 1	19 17 11	109 19 2
25.00 @ 16 c.c.s.	131 1 4	19 5 5	111 15 11

■

Irrigation Investigations: Infiltration Measurements

N. J. KING, *Report* of the Bureau of Sugar Experiment Stations, Queensland, Australia, p. 24 (1957).

A continuation of the infiltration measurements, using ring infiltrometers, indicated that, in all soils tested, the initial rate is high and irregular but at a later stage slows down and tends to assume a uniform value. Where lime applications were made the differences in infiltration rate became obvious after an hour of irrigation and were more pronounced after longer periods. With two and four tons of lime per acre, the permeability was 50 to 100% greater, although the water quantities involved were relatively small. For example, infiltration in the control areas was 0.2 inches per hour; with two tons of lime 0.4 inches per hour and, with four tons, 0.75 inches per hour.

As the time of application of a stream of water is inversely proportional to the minimum infiltration rate it is possible to

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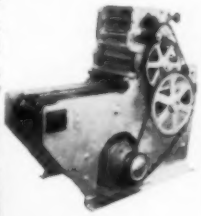

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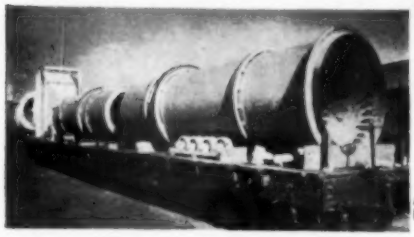

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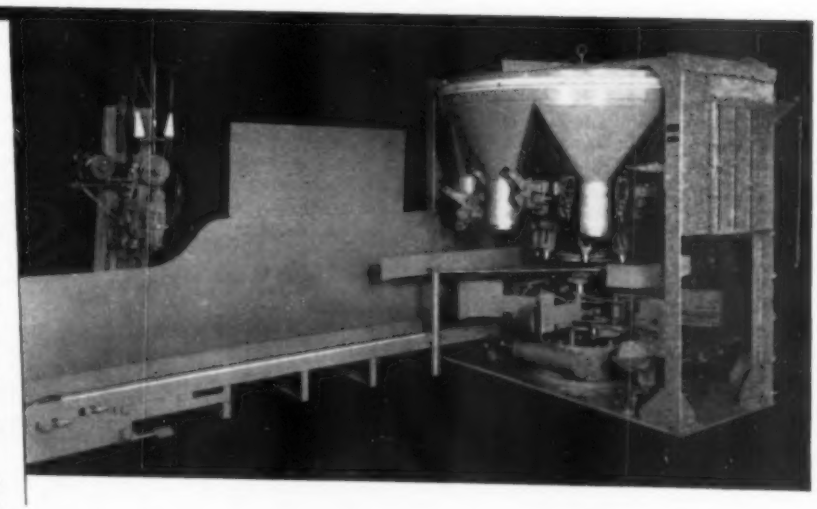

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indicate with what water flow a given acreage may be irrigated —assuming that the ring infiltrometer is a fair guide to the actual infiltration in furrow irrigation. In a specific case it was found that, for a total application of four inches of water per acre, the control plots would require 20 hours with a stream flow of 0.2 cu ft sec per acre, the two-tons lime area 11¾ hours at 0.35 cu ft sec, and the four-tons lime treatment 8 hours and 0.5 cu ft sec per acre.

■

Factory Technology

Sugar Loss in Pan Boiling of Low Purity Syrups

H. M. THOMPSON and associates, *International Sugar Journal*, Vol. 59, No. 704, pp. 213-216 (1957).

Acting on a presumption that the lower the purity of the materials being handled in the recovery-house the greater would be the sugar losses in pan boiling, a series of experiments was made at the Tate & Lyle refinery on affination, first and second sugar-crops. The results showed that there is increasing destruction with decreasing purity of the material boiled. The averaged figures show 0.17, 0.26, and 1.01% loss of total sugars to pan for affination, first and second crop syrups, respectively.

The amount of sucrose broken down during boiling ranges from 1.1 to 1.5% and is not very different for the three materials. Hence, as the purity of syrups going to pan decreases, the amount of invert sugar which is produced and subsequently decomposed increases. Chromatographic determinations of sugars show little tendency towards preferential destruction of levulose. They also indicate that the decomposition products do not possess the property of reducing Fehling's solution. The loss of total solids in the experiments with first and second crop syrups was about one-quarter of the sugar loss. There was little change in color or pH value when boiling affination syrup.

■

Use of Versene in the Sugar Industry

N. A. RAMAIAH, *Indian Sugar*, Vol. 7, No. 1, pp. 43-49 (1957).

Versene, or ethylene-diamine-tetra-acetic acid, is a crystalline organic compound which is remarkable for its power to react with insoluble heavy metal and alkaline-earth metal compounds to form soluble substances that are called "chelates." Through its property of holding in solution substances that are otherwise insoluble, it is finding use in the sugar industry for the following purposes: estimating the calcium and magnesium contents of sugar juices, estimation of reducing sugars, elimination of "lead error" in sugar analysis, cleaning evaporator tubes, and cleaning filter cloths.

At the Kanpur Sugar Institute a simple and efficient method for determining reducing sugars by titration has been worked out. This method is essentially similar to the Fehling method except that instead of Fehling's mixture, use is made of a solution containing nine grams of the disodium salt of versene, five grams of NaOH and 3.5 grams of $CuSO_4$ in 100 ml. of water. Methylene blue is used as the indicator. The new reagent using versene is relatively stable; the same titre values are obtained even fifteen days after its preparation.

In routine sugar analyses lead salts are added for clarification purposes. These lead salts introduce error into the pol readings due to formation of lead complexes which have different rotary power. Versene "chelates" these lead compounds and prevents this error. The procedure is to add an appropriate quantity of a mixture of versene and sodium hydroxide; it is then unnecessary to de-lead the solution by addition of oxalic acid or its salts or sodium phosphate etc., and then filtering off the precipitated lead.

Use of versene for removing scale from heater tubes, evaporators and distillery columns is still in the experimental stage, with very encouraging results. The principal difficulty now resides in the high cost of versene; however, this inconvenience can be largely overcome by efficient regeneration of the used versene cleaning solution, which can be done by acidifying with concentrated sulfuric acid to pH 3.0-3.5, heating, and stirring for 30-40 minutes; later the precipitated calcium sulfate is filtered off, the liquor is drawn into a different vessel and treated with more acid to pH 1.4-1.8, and the versene acid is allowed to crystallize and after filtration or settling it can be reconverted into the sodium salt.

■

Continuous Filtration of First Carbonation Juice

J. DELCOURT, *Sugar y Azúcar*, Vol. 52, No. 4, pp. 21-23 (1957).

During the 1956 season at the Notre Dame refinery (Belgium) there was put into service a "filter-thickener," patented by Compagnie Fives-Lille. This apparatus consists of a cylindrical tank mounted on a central hollow shaft carrying 12 hollow disks, each of which is divided into ten sectors perforated on their flat surfaces and covered with filter cloth, presenting a filtering area of 1100 sq. ft. The hollow sectors of each disk are connected with a single manifold within the hollow shaft. The ten manifolds lead to two distribution heads comprising four compartments each, located at the two ends outside the tank.

Rotation speed of the shaft is controllable within 0.15 to 1 rpm. Pressure is controlled by a valve on the juice inlet pipe. The tank operates with its filtering disks entirely submerged in the turbid juice. The filtered juice flowing through the ten manifolds is discharged into three of the four distributing heads. Pressure regulators maintain adjustable back-pressures in these three compartments. Filtration is accomplished under gradually increasing pressure, thus avoiding choking of the cloth. At each rotation of the central shaft, each filtering sector is connected with the three discharge compartments, so that filtration occurs under three stages of pressure: one-third, two-thirds, and full pressure, and the filtered juice flows out of the fourth compartment, which is under atmospheric pressure.

During the same rotation the mud of each sector is discharged by injecting a small amount (12%) of clear juice and falls into the distributing head where an automatic valve maintains a pressure slightly above the pressure in the tank, regardless of possible variations. The dislodged juice then falls into a mixer where it is homogenized and goes to the Dorr-Oliver filter.

Duration of the four phases of filtration depends on the rpm of the shaft and the size of the four compartments. The latter are designed so that the first filtration is accomplished over a rotation angle of 80°, the second at an angle of 90° and the third at 155°; flushing of the mud occurs over the remaining 35°. Capacity and first cost of this outfit are about the same as those of an ordinary filter station. Brix and purity of the clear juices are practically identical, but juice from the filter-thickener is brighter. The filter-thickener occupies less space, and there is less sugar lost in the cake. No significant operational difficulties arose during the campaign. However, a prime condition is to have a limed juice with good Brieghel-Mueller filtration coefficient. It is mandatory on the factory staff to make certain that the raw juice has been properly purified.

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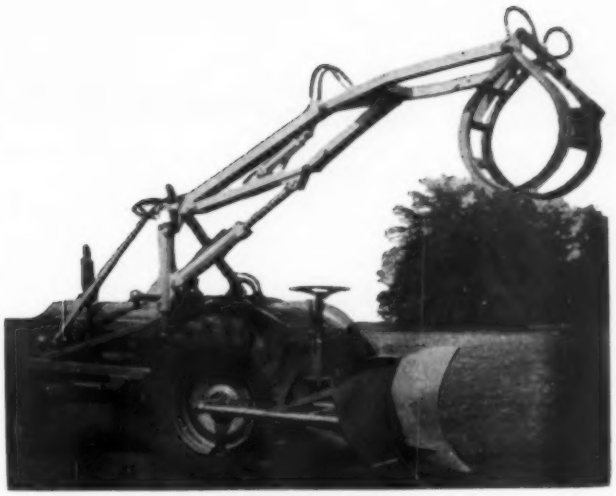

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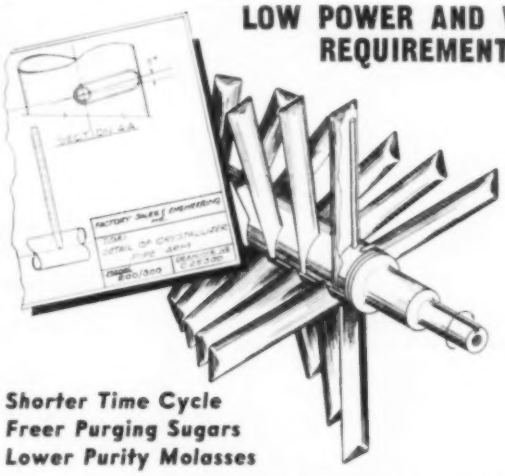

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Active Year on N. Y. Sugar Exchange

In volume of turnover, trading in world sugar on the New York Coffee and Sugar Exchange during 1957 made history in the postwar commodity markets, according to the 76th annual report published in January 1958 by the Board of Managers. A record total of 9,022,850 tons were traded for the year, compared to 1,725,150 tons during 1956. May, the highest month, almost matched the entire 12-months total for 1956 with 1,243,600 tons traded.

According to Mr. Leon Israel, president of the Exchange in 1957, the importance of the world sugar market was felt throughout a troubled world. "All segments of the sugar trade—producers, consumers, merchants, brokers, shippers, as well as representatives of governments—looked to the Exchange here in New York for protection against price and supply uncertainties," he said.

Unloading Facilities

(*Continued from page* 27)

seen, sugar is dropped from conveyors at the top, presses against the walls of the warehouse as high as the black lines along the side and then assumes its normal angle of repose. Sugar is returned to the vehicle loading tower for shipment to the refinery by means of a conveyor running the length of the warehouse through a tunnel in center of the floor.

■

California Growers

(*Continued from page* 25)

does on the same acreage," he said. "The extracted sugar is a plus factor."

"It looks quite likely that sugar beets have the ability to hold their place in our economy against all competition in the years ahead, provided enough utilization research is done, along with production and marketing research. Research on processing of tops is needed in order to arrive at a stable industrial product—one that can be made and sold economically. Research is needed to develop a feed product made from the beet itself, as an additional outlet for the crop or as an alternative to sugar.

"Continuing research is needed on the manufacture of beet sugar and its by-products, because the beet sugar industry, like all other industries, is advancing as research reveals new information on products, processes, and individual steps in processes."

H. M. Tysdal, Beltsville, Md., another USDA scientist, brought a report on progress in sugar beet production research. He heads the crops research division of the Agricultural Department.

"Research has developed disease-resistant varieties, such as resistance to the curly top virus, without which sugar beet growing in California would be impossible," Tysdal said. "Research leading to improvement in fertilizer and cultural practices has resulted in a 70 per cent increase in sugar production per acre over the last 40 years," he reported.

But still new problems arise requiring new research, Tysdal said, pointing out examples such as the nematode menace and the new virus yellows diseases which cut the value of the sugar beet crop in California's Kern county, alone, by a million dollars last year.

Another speaker was Richard W. Blake, Greeley, Colo., executive secretary, National Beet Growers Federation, who urged continued beet sugar aggressive sales efforts in western states.

Delegates to the California beet growers' meeting re-elected five directors-at-large: J. S. Brown, Jr., Walnut Grove; Lloyd M. Eveland, Woodland; Arnold Frew, King City; James C. Simons, Brawley, and Lester H. Travis, Tulare.

Also re-elected were officers of the group: Owen S. Rice, Santa Maria, president; Chester W. Locke, Lockeford, vice president; Gordon Lyons, Stockton, secretary-treasurer and executive manager, and Mrs. Mildred Leonard, Stockton, assistant secretary-treasurer.

Directors elected earlier at district meetings include, along with Rice and Locke: A. H. Clark, Soledad; R. M. Farnsworth, Grimes; Jack Harelson, Calexico; Robert P. Heringer, Clarksburg; H. G. McKeever, Corcoran; A. A. Oliver, Jr., Mt. Eden; Joe E. Zane, Woodland, and Gregrey, Malofy, Wasco.

The board voted to return to San Francisco in 1959 for the next annual meeting.

■

Sparkler Filters

(*Continued from page* 33)

trol has been installed which has substantially reduced the labor and material costs over that of plate and frame filtration and at the same time greatly improved the safety and efficiency of this operation at a reasonable cost.

■

Human Relations

(*Continued from page* 31)

commodities in the Hawaiian Islands exceeded income and employment in service industries. Today, the reverse is true. Services have become Hawaii's most important product. Service to the military is first and tourists are the next largest service industry.

Strikes in the U. S. during 1957 idled fewer workers than in any year since World War II. The number of man-days lost because of strikes last year also dipped to a postwar low.

■

Schedule For Cane Technologists

The tentative itinerary for The 10th Congress of the International Society of Sugar Cane Technologists, which will be held in Honolulu, Hawaii, May 3 through 22, 1959 has set up the following tenative schedule:

May 3 (Sunday), Arrival in Honolulu.

May 4, Registration, Opening Session.

May 5, 6 and 7, Field delegates will visit the Experiment Station, HSPA, and sugar plantations on Oahu. Factory delegates will visit the Experiment Station, HSPA, bulk loading installation, Aiea refinery, and Oahu plantations.

From May 8 through the 17 Factory delegates and Field delegates will have separate tours to the islands of Kauai, Maui and Hawaii.

Field Delegates:

May 8, Fly to Maui. Visit Hawaiian Commercial & Sugar Co. In the afternoon fly to Kona, Hawaii.

May 9, Sightseeing, Kona.

May 10 (Sunday), drive from Kona to Hilo, via Volcano House for lunch and tour of craters.

May 11, Plantation tours, Hilo Coast, Hawaii.

May 12, Plantation tours, Hamakua Coast, Hawaii.

May 13, Plantation tour, Olaa Sugar Co. in morning. Fly to island of Kauai in afternoon.

May 14-15, Plantation tours, Kauai.

May 16, Sightseeing, Kauai.

May 17 (Sunday), Sightseeing Kauai in morning. Fly to Honolulu in afternoon.

Factory Delegates:

May 8, Plantation tours, Oahu.

May 9, Fly to island of Kauai, sightseeing.

May 10 (Sunday), Sightseeing, Kauai.

May 11-12, Plantation tours, Kauai.

May 13, Fly to island of Maui in morning, visit Hawiian Commercial and Sugar Co., and on to Hilo, Hawaii, in afternoon.

May 14-15, Plantation tours, Hawaii.

May 16, drive from Hilo to Kona, via Volcano House. Tour of craters.

May 17 (Sunday), Fly from Kona to Honolulu.

May 18-22, Sessions of the 10th Congress, meeting in the beach area of Waikiki, using convention facilities of one of the major hotels.

May 23, Departure.

It is estimated that minimum cost per delegate will be $500 plus transportation to and from Hawaii. This will include hotels, meals, air transportation between Islands, local transportation, tours (but not "sightseeing"). Sightseeing tours can be arranged for those delegates desiring same.

■

Letter to the Editor

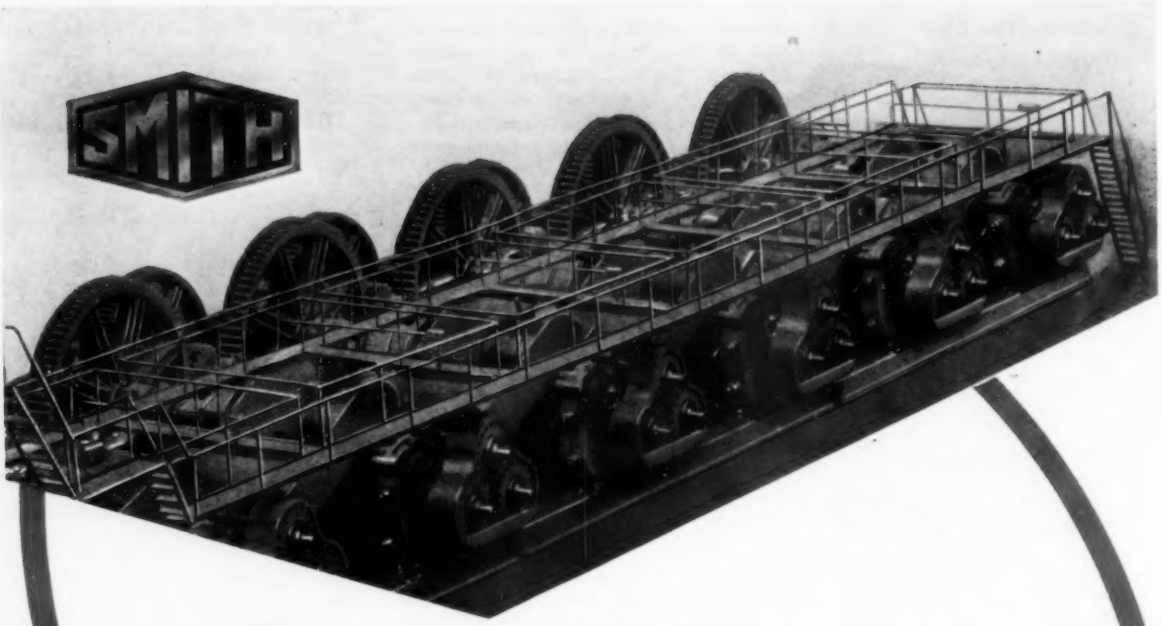
To the Editor:

Your readers have evidenced a great deal of interest in the prints of sugar operations of years past which we are offering through the advertising pages of your book.

In fact, their interest is so great as to cause us some embarrassment. Because of the number of requests and the fine craftsmanship required to make the prints, we have fallen far behind our schedule.

Would it be at all possible for you to express to your readers our sincere regrets for the delay, and assure them that their requests will be filled as soon as possible?

William T. Scott
Atlas Powder Company



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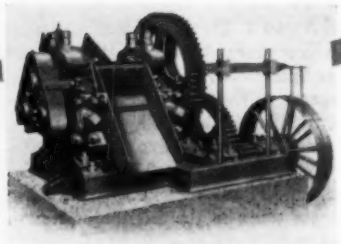

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AZÚCAR
Marzo 1958

Filtros Sparkler en Betteravia

Filtración Semiautomática de Jugos de Remolacha

Por M. A. Woods
Superintendente de Fábrica
Union Sugar Division, Consolidated Foods Corp.

La fábrica de azúcar de remolacha de la Union Sugar Division de la Consolidated Foods Corporation, en Betteravia, California, tiene dos campañas al año; a principios del verano beneficia remolacha traída del famoso Valle Imperial, y en el otoño emplea remolacha proveniente de la región costeña del estado de California. Como parte de su programa de modernización y mejoras, la empresa ha instalado una batería de cinco filtros semiautomáticos fabricados por la Sparkler Manufacturing Company y designados como el tipo RSC. La instalación y funcionamiento de este importante equipo aparecen descritos en un artículo que parte de un escrito presentado por el Sr. Woods en la Décima Reunión General de la Sociedad Americana de Technólogos de Remolacha celebrada en Detroit el 4 de febrero.—*Editor.*

Durante los últimos años, tanto los fabricantes de equipo azucarero como los elaboradores de azúcar vienen tratando de reemplazar los filtros prensas de placas y cuadros—muy resistentes pero que implican mucho trabajo—con un tipo de filtro que logre el mismo fin pero que requiera menos trabajo manual. Entre los tipos de filtros sugeridos se encuentran aparatos muy complicados completamente automáticos, aparatos parcialmente regulados, y aparatos cuyas características en lo que a trabajo manual se refiere los hacen menos deseables que los filtros originales que pretenden substituir.

Después de haber probado varios tipos de filtro de lavaje interno, a principios de 1956 se puso a prueba un filtro Sparkler tipo RSC. Los resultados experimentales obtenidos con este filtro, empleando placas cubiertas de tela *dynel*, demostraron que se podrían esperar rendimientos hasta 12.5 galones por pie cuadrado de superficie filtrante por hora y que la velocidad de flujo a través del filtro podía variar extensamente sin afectar la claridad del jugo ni la duración del ciclo de corrida en alto grado.

La facilidad de manejo y la capacidad del filtro de resistir combios de carga demostraron claramente que este aparato podía ser fácilmente regulado automáticamente, lo que permitiría reducir el trabajo manual a un solo operador.

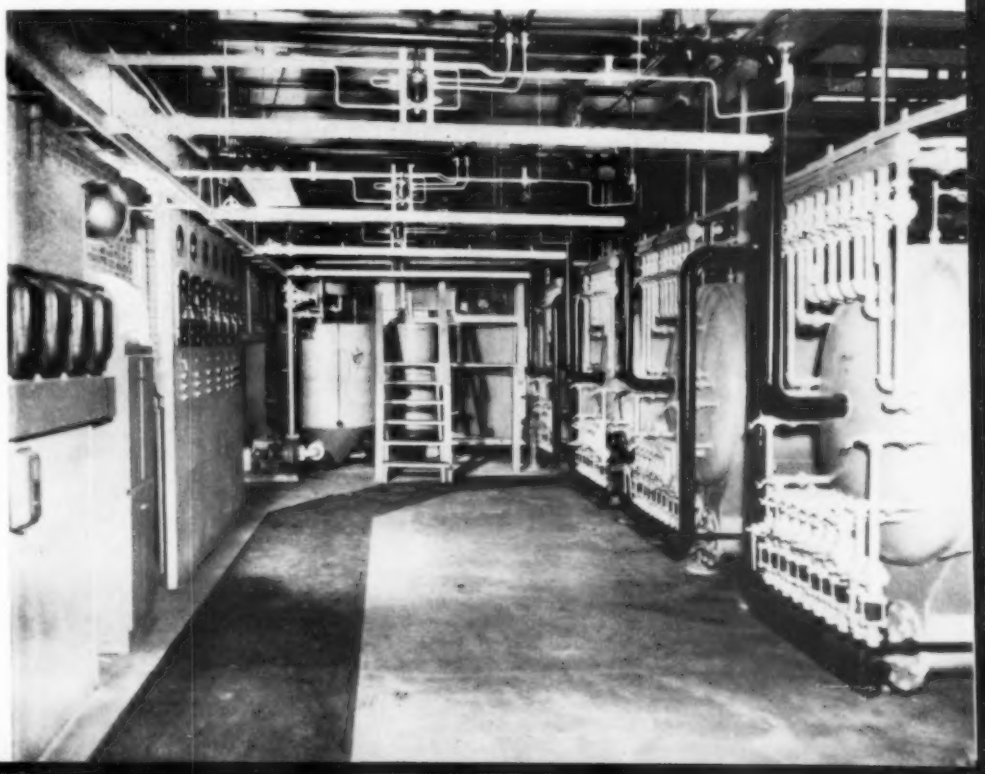
Se acordó instalar cinco filtros de 300 pies cuadrados de superficie filtrante cada uno, tomando como factor de seguridad un promedio de siete galones por pie cuadrado de superficie filtrante por hora. Los aparatos más pequeños se consideraron más convenientes que los grandes, a fin de facilitar el manejo de las hojas del filtro y hacer su operación lo más flexible posible.

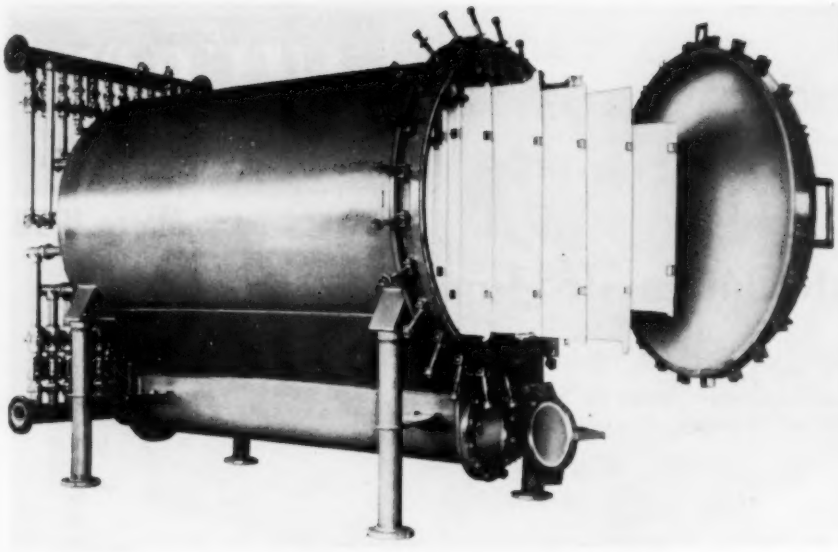
La instalación cupo cómodamente en el área disponible, dejando amplio espacio para su operación, en contraste con el conglomerado anterior debido al mayor espacio ocupado por los filtros prensas de placas y cuadros. El mayor espacio de trabajo entre los filtros y las condiciones de operación más cómodas redujeron en alto grado el problema de la asepsia y aminoraron el peligro de accidentes debido a pisos obstruídos, resbalosos o mojados.

La nueva batería consta de cinco filtros Sparkler tipo RSC completamente integrales, de lavaje interno, los cuales se conservan cerrados excepto cuando se cambian o reponen las hojas. Un mezclador en espiral en el fondo de los filtros permite remover la torta y devolverla al proceso, por gravedad, al terminar el ciclo, sin abrir el filtro.

El tubo de flujo de cada hoja del filtro

La instalación en Betteravia muestra cuatro de los cinco filtros con tubos de lavaje por aspersión para cada hoja en la parte superior y válvulas reguladoras de descarga y cristales indicadores en el fondo. A la izquierda puede verse el tablero de regulación, y al fondo los depósitos de jugo y de precapa.





Los cinco filtros Sparkler Tipo RSC de 300 pies cuadrados aqui ilustrados son operados en Betteravia por un solo hombre debido a su fácil manejo. Las hojas se pueden retirar individualmente y reponer por un carro deslizable montado en rodillos. Se adoptó un programa semanal regular para el cambio de los paños de los filtros.

está provisto de una válvula y vidrio indicador de modo que si una hoja no funciona se cierra el paso de esa hoja y el filtro no tiene que ser inmobilizado.

Se emplea un tablero de instrumentos para regular la alimentación de los filtros automáticamente desde un punto central. El diseño de este sistema de regulación se funda en los siguientes factores funcionales:

1. La operación de cualquiera o de todos los filtros de acuerdo con la afluencia de jugo entrante.
2. Limitar la afluencia máxima a cada filtro a cualquier cantidad determinada mientras los filtros están funcionando.
3. Poder operar cualquiera o todos los filtros a cualquier régimen de flujo constante que se desee.
4. Hacer el sistema de regulación lo más sencillo y seguro posible bajo el punto de vista del operador.

Estos objetivos se lograron con instrumentos accionados por aire. Estos instrumentos registran el nivel del tanque de compensación del jugo entrante y transmiten una señal regulada por aire en proporción con el nivel de este tanque a los reguladores de flujo accionados por aire en el tablero central, correspondientes a cada filtro. Este sistema de regulación no se utiliza cuando los filtros se dejan funcionar bajo un régimen de flujo constante.

Cuando el regulador central se coloca en "automático", la afluencia al filtro varía en proporción con la afluencia de jugo a la estación de filtros. Colocando el regulador en "flujo fijo", se mantiene un régimen de flujo constante. Cualquiera de los filtros puede ser operado desde este punto central bajo uno u otro método de regulación del flujo.

Todas las demás operaciones se realizan manualmente y no requieren gran esfuerzo físico de parte del operador. Este operador se emplea en lugar de una extensa serie de instrumentos y para eliminar los dolores de cabeza iniciales y poner en pleno funcionamiento y sin dificultades dicho sistema automático. El presente sistema implica un costo inicial menor y menos gastos de conservación que un sistema completamente automático, todo ello con poco o ningún sacrificio de hombre-horas. Pues en una operación tan importante como la filtración de jugos, aun con un sistema de regulación completamente automático, siempre sería conveniente tener una persona presente para observar la operación de la estación, para asegurar de que "todo ande bien", y para poder atender prontamente a cualquier dificultad.

Los datos registrados en la Tabla I ofrecen un resumen de los resultados obtenidos. Durante ambas temporadas de trabajo se mantuvo un régimen de flujo promedio en exceso de ocho galones por pie cuadrado de superficie filtrante por hora. Se obtuvieron régimenes de flujo hasta 15 galones por pie cuadrado por hora sin gran sacrificio de la duración del ciclo de filtración. Se mantuvo suficiente capacidad de flujo en reserva en todo momento para permitir un flujo mayor que el promedio cuando se hizo necesario.

Durante el primer mes, la operación de los filtros fué alternada, utilizando dos aparatos cada turno, lo cual explica la corta duración de los ciclos. Esta práctica fué moderada gradualmente a medida que los operadores adquirieron experiencia, al cabo de lo cual se adoptó la práctica de cambiar de filtros al llegar a una presión de trabajo de 40 libras por pulgada cuadrada.

La eficiencia de los filtros fué comprobada cada hora, para lo cual se utilizaron almohadillas blancas y negras comprobadoras de la claridad del filtrado. Las muestras de filtrado también fueron analizadas en el laboratorio central cada hora y los resultados fueron registrados cada cuatro horas.

Este sistema de comprobar el trabajo de los filtros fué establecido en lugar del método de doble filtración, cuyo primero ha dado muy buenos resultados hasta ahora. No se ha experimentado dificultad alguna en mantener óptima eficiencia filtrante.

Las oscilaciones en la afluencia de jugo a la batería fueron reguladas poniendo tres filtros en servicio primero bajo un régimen de flujo fijo, y dejando a los otros dos filtros la compensación de las oscilaciones en afluencia. Esta práctica no acortó los ciclos de filtración sensiblemente ni aminoró la eficiencia de los filtros.

El desalojamiento de los filtros al termi-

(Sigue en la página 72)

TABLA I. Eficiencia promedia de cinco filtros de 300 pies cuadrados cada uno. (Manejando jugo de 68-70 Brix)

Mes	*No. de Ciclos por Filtro*	*Duración de los Ciclos (Horas)*	*Rendimiento (G. P. M.)*	*Galones por Ciclo*	*Corrida por Pie² por Hora (Galones)*
Junio	51	11.4	46.2	31,573	9.2
Julio	24	18.24	40.4	44,238	8.1
Agosto	23	17.9	43.4	46,616	8.7
Septiembre	30	19.8	41.5	49,259	8.3
Octubre	25	20.13	38.4	46,394	7.7
Noviembre	11	23.13	40.7	56,468	8.1
Promedio— Campaña de Verano		14.82	42.6	37,905	8.5
Promedio— Campaña de Otoño		20.22	41.0	49,684	8.2

TABLA II. Consumo y costo de material comparativos—1956-1957. Filtros Sparkler contra filtros de placas y cuadros (Manejando jugo de 68-70 Brix)

Concepto	*1956*	*1957*	*Reducción*	*Costo por Ton. de Remolacha 1956*	*Costo por Ton. de Remolacha 1957*
Consumo de Tela	3305 yds.	450 yds.	2855 yds.		
Costo de la Tela	$ 2,886.68	$ 712.71	$2,173.97	0.59¢	0.11¢
Mano de Obra	$12,821.76	$7,857.07*	$4,964.69	2.6¢	1.3¢*
Total	$15,708.44	$8,569.78	$7,138.66	3.2¢	1.4¢

* Escala de Jornales—1956.

Reseña de Un Importante Nuevo Libro

AZUCAR-de la Escasez al Exceso

Por Hubert Edson*

He aquí una reseña de la vida de un tecnólogo de azúcar de caña que probablemente no tiene paralelo en la historia de esta extensa industria—un recuento de sus 62 años de servicio continuo tanto difícil como de responsabilidad en muchos países, alternativamente intercalodo con períodos de desilusión y de gran éxito, de adversidades personales y de triunfos tecnológicos que han contribuído en alto grado a la ciencia y arte de fabricar azúcar de caña.

Esta historia comienza allá por el año de 1888 cuando un joven campesino de 17 años nacido en Indiana fué empleado por su famoso tío, el Dr. Harvey W. Wiley, para lavar las botellas en el laboratorio azucarero del Departamento de Agricultura de E.U.A. En aquella época, el mercado azucarero en Norteamérica se encontraba en una situación difícil. La población estaba aumentando y el consumo de azúcar, aunque menos que en el presente, estaba aumentando contra un escaso suministro nacional proveniente de unos cuantos míseros centrales azucareros en Louisiana.

La industria de azúcar de remolacha en Norteamérica apenas estaba naciendo, con una capacidad anual de menos de 700 toneladas, de modo que el suministro nacional de azúcar no pasabe de diez por ciento del consumo. Se recibían pequeñas cantidades de azúcar provenientes de Hawaii, Puerto Rico, Filipinas y Cuba, y el resto era traído de puntos tan lejanos como Alemania y Java. El precio del azúcar en aquellos tiempos, aunque bajo en contraste con los crecidos precios de 1958, era relativamente alto, lo que evidentemente limitaba el consumo. El Dr. Wiley no anticipaba gran aumento en producción en Louisiana ni la expansión inmediata de la industria de azúcar de remolacha, por lo que dirigió su atención a la zahina o sorgo que tenía mayor contenido de azúcar que la remolacha.

Mientras tanto, su lavador de botellas se encontraba asimilando ávidamente los elementos de la química azucarera, y aun antes de cumplir su mayor edad fué puesto a cargo de los ensayos análiticos en el programa de estudios de la zahina. Entretanto, el Dr. Wiley estaba instando a los productores de Louisiana a que adoptasen el proceso de difusión. Dos de ellos probaron dicho proceso con resultados positivamente desalentadores.

Pero la insistencia del Dr. Wiley les hizo reconocer el hecho que sus molinos en ningún caso extraían más de tres cuartas partes del azúcar en la caña, por lo que le pidieron que les ayudase a descubrir la causa. Su respuesta fué enviar a Louisiana dos de sus jóvenes más inteligentes, incluyendo al joven Edson, que fué asignado al central Calumet.

Allí, Edson fué favorecido por uno de esos raros caprichos de la fortuna que deciden el desino del hombre. Sucedió que la caña cosechada en la campaña de 1888 fué de tan buena calidad que no se había igualado antes ni se volvió a igualar desde entonces. El tándem funcionó perfectamente y los informes de producción al fin de la campaña acusaron una extracción de azúcar en exceso de 200 libras por tonelada de caña en vez del rendimiento usual de 150 libras. Con una precisión característica, el joven Edson mantuvo un cuidadoso registro del trabajo de la fábrica, indicando la cantidad de azúcar recibida en la caña y la cantidad extraída por los molinos. El coeficiente de extracción se aproximó a 92%.

El Dr. Wiley se sintió tan satisfecho con los resultados que hizo publicar el informe de Edson como un boletín official del Departamento de Agricultura. Los productores de Louisiana también se sorprendieron. El central Calumet fué visitado por numeros observadores, y las demás fábricas comenzaron a emplear químicos.

Este episodio estaba destinado a tener gran efecto en la tecnología de la industria de azúcar de caña. Por primera vez parecía que casi todo el azúcar en la caña se podría extraer, si las cañas entregadas al tándem venían debidamente preparadas y la compresión de los molinos era bastante alta. La baja extracción se debía a la poca presión de los pequeños trapiches, y el único recurso era la instalación de equipo de molienda más pesado y mejor diseñado. La solución se encontró en largos trenes de molinos de tres mazas y en el empleo de desmenuzadoras, desfibradoras y cuchillas giratorias para reducir los tallos duros de caña a briznas que soltasen el jugo bajo alta presión. Ya no se hablaba de la industria de la zahina ni de la aplicación del proceso de difusión a la caña de azúcar.

Edson fué seguidamente nombrado superintendente de fábrica y luego gerente de la fábrica y de los trabajos de campo, pero no le asignaron cargo alguno en la administración comercial de la empresa, lo que dejó su labor expuesta a circunstancia fuera de su dominio. La mala administración financiera arruinó la compañía, por lo que tuvo que buscar otro empleo. Edson estuvo una breve temporada en Hawaii. Luego volvió al central Calumet bajo mejores circunstancias, las que volvieron a empeorar. Después de esto permaneció muchos años fuera del país, durante los cuales ocupó cargos en Cuba y en la República Dominicana (Santo Domingo), y por último llegó a ser superintendente del gigante Central Guánica en Puerto Rico. Entonces ya Edson tenía desarrollado un plan que lo llevaría a campos de actividad mucho más amplios que los que podría esperar permaneciendo en una central. El conocía mucha gente en la industria azucarera, pues había visitado muchas fábricas de azúcar de caña y conocía sus métodos y sus problemas. Sus observaciones le decían que había cabida para una empresa administradora y operadora que pudiese hacerse cargo y administrar los negocios de empresas mal administradas y encaminarlas nuevamente. Su idea se cristalizó en la formación de la West India Management and Consultation Company, la que comenzó a operar poco antes de la Primera Guerra Mundial.

Inmediatamente, Edson y su empresa administradora entraron en un período de gran actividad y lucro. En 1914, el azúcar crudo de caña se vendía a dos centavos la libra. El movimiento de azúcar del exterior fué interrumpido inmediatamente, y el precio ascendió a 4, 5, 8, 10 y a 20 centavos progresivamente. Las fábricas existentes comenzaron a obtener muy buenas ganancias. Seguidamente se inició un gran esfuerzo por elevar la capacidad de producción. Inmediatamente se comenzaron a dedicar tierras vírgenes al cultivo de la caña y se invertieron cientos de millones de dólares en el ensanche de fábricas viejas y en la construcción de nuevos centrales. En esta "danza de los millones", Edson fué llamado a demostrar, como no lo había hecho antes, su habilidad como planeador y administrador, y a confrontar situaciones tanto urgentes como desconcertantes. Al fin, esta era frenética terminó con la vuelta al estado de paz. Los precios del azúcar descendieron a los viejos niveles y el mismo ciclo de alzas y bajas volvió a repetirse durante la Segunda Guerra Mundial.

Este libro es fácil de leer, porque el Sr. Edson tiene el don de expresarse con claridad y un sentido de sincronización y proporción; una vez que se comienza a leer, se hace difícil dejarlo aunque la relación del lector con la parte práctica de la fabricación de azúcar no sea muy íntima. Su juicio y aprecio los méritos del hombre es bien marcado y preciso y, tal como los eventos lo probaron, está justificado; al mismo tiempo reconoce francamente sus errores. Cita nu-

(Sigue en la página 72)

* "Sugar, from Scarcity to Surplus" (Azúcar, de la Escasez el Exceso), por Hubert Edson. Prólogo por el Dr. Pieter Honig. Publicado por Chemical Publishing Co., Nueva York, 1958. 217 páginas. $5.00.

Farrel Termina la Construcción de Un Trapiche para la South Porto Rico Sugar Co.

Tándem de 7000 Toneladas para el Central Romana

Por Philip H. Dreissigacker

Ingeniero-Jefe de Ventas de la Farrel-Birmingham Co., Inc.

Uno de los trapiches de caña más modernos del mundo fue embarcado del puerto de Nueva York este mes (enero de 1958) a la República Dominicana exactamente un año después de recibir el pedido. Este trapiche va consignado al Central Romana, propiedad de la South Porto Rico Sugar Company. Como la instalación del nuevo tandem quedará terminada durante el primer trimestre de 1958, se espera que llegue a moler parte de la cosecha actual.

Este enorme tándem, en el que se han incorporado muchas innovaciones, fue diseñado y construído por la Farrel-Birmingham Company de Ansonia, Connecticut. Consta de seis molinos de tres mazas cada uno de 38 pulgados por 84 pulgadas, el que se calcula tendrá una capacidad de molienda de 7,000 toneladas de caña diarias.

El 10 de diciembre, cuando el pueblo de Ansonia, Connecticut se encontraba cubierto de una manta de nieve, en contraste con la futura morada del nuevo trapiche, un grupo de importantes funcionarios de la South Porto Rico visitó la planta de la Farrel-Birmingham para ver el támden completamente armado. Entre los visitante se encontraban W. T. Hennessey, presidente de la Junta de Directores, G. D. Debevois y E. C. Spaeth, presidente y vicepresidente la South Porto Rico, respectivamente. Estos señores vinieron acompañados de W. K. Peay, jefe de máquinas, y R. V. Marioneaux, administrador del Central Romana, respectivamente, y el señor C. English.

Además del gran tamaño del nuevo tándem y de los detalles extraordinarios de su construcción, la gerencia de la Farrel-Birmingham se siente orgullosa de la rapidez con que se cumplió este pedido, el cual fue colocado en febrero de 1957 y embarcado en enero de 1958, y estará funcionando quince meses después de haber colocado la orden.

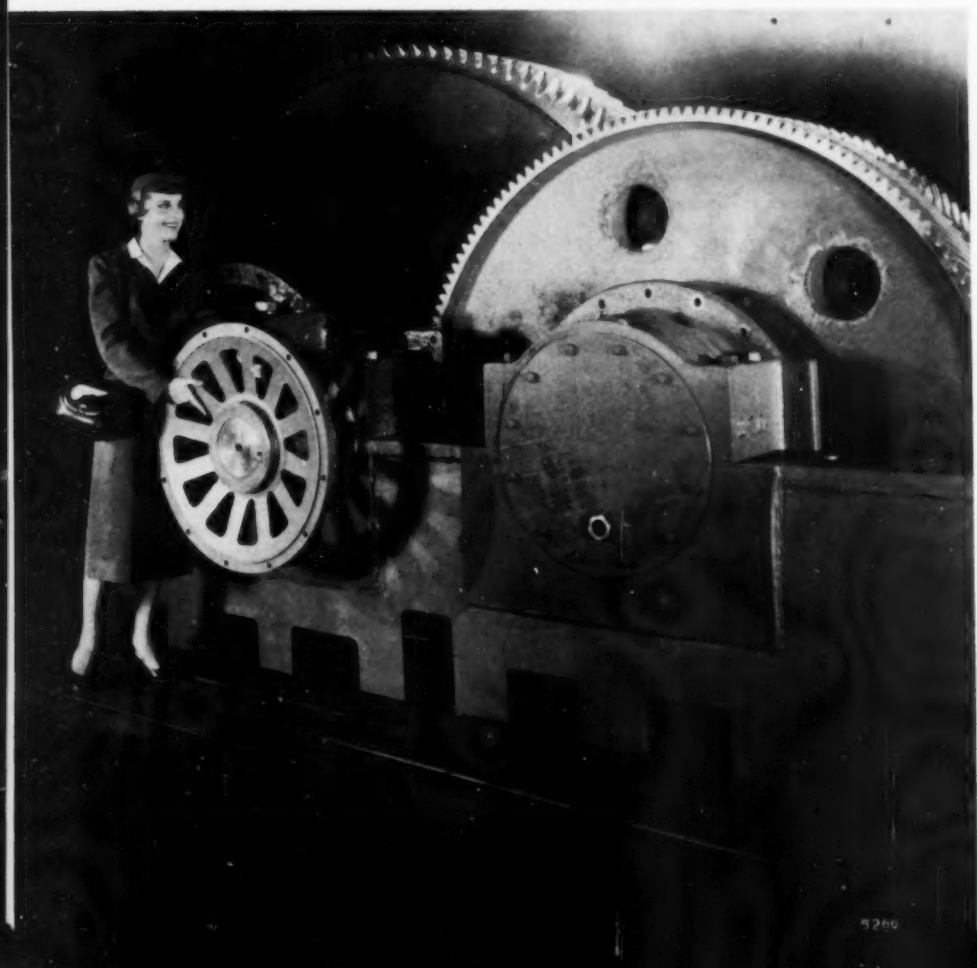
El tándem se compone de seis molinos de tres mazas de idéntico diseño excepto que el ranurado de las mazas es de paso progresivamente más pequeño de acuerdo con las especificaciones de los técnicos de la South Porto Rico. Cada molino es accionado por una turbina Murray a vapor de 815 c.f. y 4800 r.p.m., capaz de desarrollar un máximo de 1290 c.f. y 5000 r.p.m. La transmisión consta de dos engranajes de doble reducción que le dan a las mazas una velocidad óptima de 67 pies por minuto. Su capacidad de molienda se calcula en 7000 toneladas de caña cada 24 horas.

Los engranajes de cada molino son independientes y están completamente separados de los otros molinos. Las dos primeras reducciones desde la turbina vienen en una caja de engranajes de doble reducción y alta velocidad completamente cerrados y lubricados por un sistema integral de bomba de aceite, filtro y enfriamiento. Acoplado a estos va un segundo juego de engranajes de doble reducción completo con su caja de engranajes lubricados a salpique desde un depósito en el fondo de la caja. Este segundo juego de engranajes reductores incluye cojinetes de rodillos esféricos de autoalineamiento, lo que reduce la fricción al mínimo, como podrá verse por la ilustración inserta.

El segundo juego de engranajes reductores se acopla al molino por una acopladura de norma de casquillo cuadrado. En molinos del tipo anterior se anticipaba que esta acopladura rompiese si el molino llegase a parar abrubtamente; para evitar un accidente tan costoso, los fabricantes instalaron un embrague tipo Wichita accionado por aire entre los dos grupos de engranajes para desembragarlos en casos de paros repentinos. Este embraque permite operar la turbina para fines de inspección mientras el molino permanece desembragado y, a la inversa, permite parar el molino independientemente de la turbina por válvulas operadas desde el tablero de mandos.

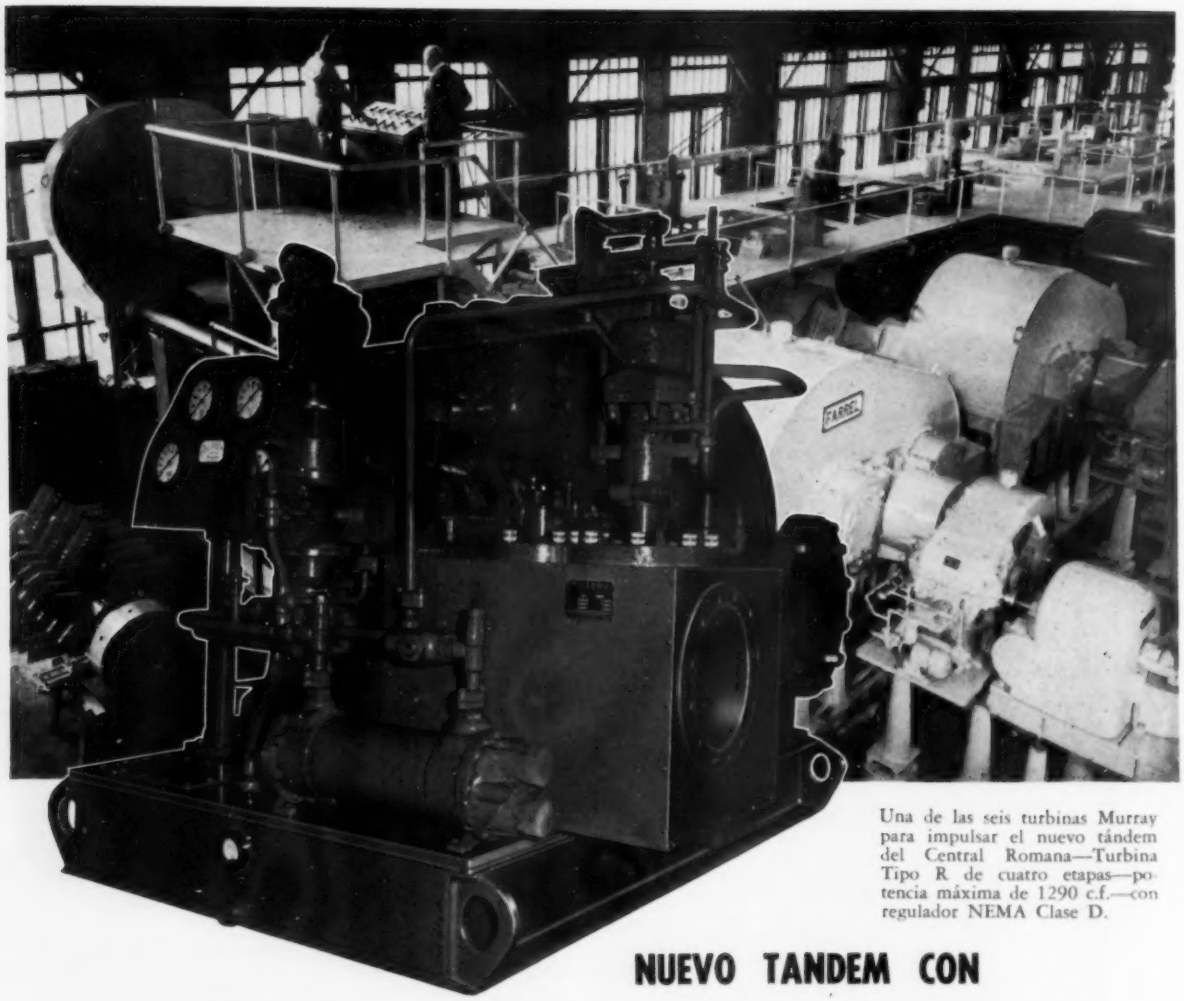
Todos los engranajes del tándem son del

Una dama entre los visitantes hace girar lentamente un grupo de engranajes reductores para demostrar la disminución de fricción lograda con el empleo de cojinetes de rodillos esféricos de autoalineamiento.



GEORGE FLETCHER & CO LTD TALLERES MASSON LITCHURCH LANE DERBY INGLATERRA

PARA EL CENTRAL ROMANA . . .



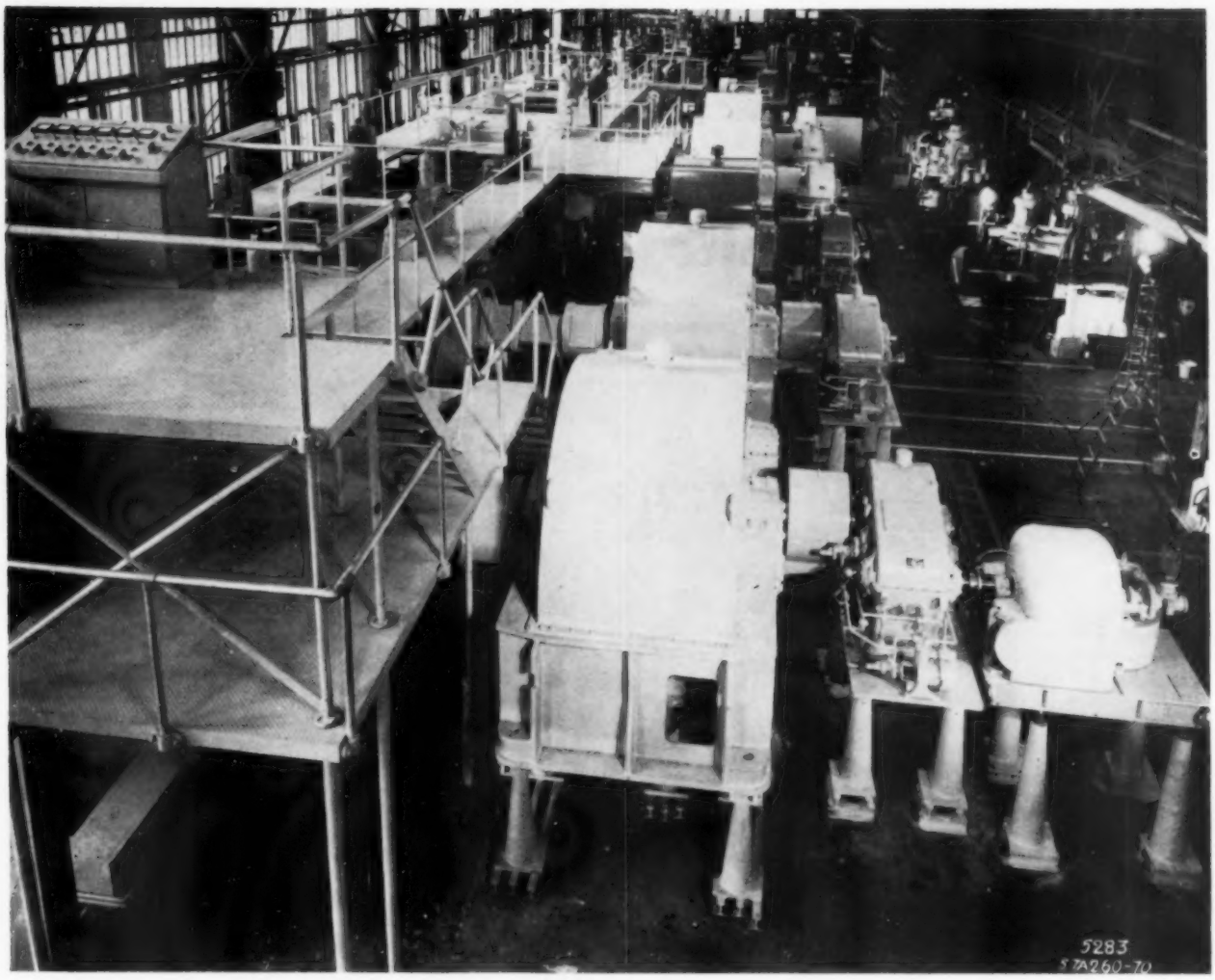
Una de las seis turbinas Murray para impulsar el nuevo tándem del Central Romana—Turbina Tipo R de cuatro etapas—potencia máxima de 1290 c.f.—con regulador NEMA Clase D.

NUEVO TANDEM CON TRANSMISIONES A TURBINA INDIVIDUALES POR MURRAY

Con la instalación en 1958 de las nuevas transmisiones, el Central Romana será el segundo de la South Porto Rico Sugar Company que cuenta con un tándem impulsado por turbinas todas por Murray.

MURRAY IRON WORKS CO.
BURLINGTON, IOWA

Murray
TURBINES



Después de terminado, el tándem fue totalmente armado en los talleres de Farrel-Birmingham en Ansonia, Connecticut y examinado por importantes funcionarios de la South Porto Rico Sugar Co. Obsérvese el gabinete de mandos arriba a la izquierda, las turbinas Murray y las transmisiones por dos grupos de engranajes de doble reducción. Cada parte del tándem va pintada de un color distinto para facilitar su mantaje en el central.

tipo doble helicoidal y dientes fresados, fabricados en la planta de F-B en Buffalo, New York. Los engranajes pequeños y los piñones son de aleación de acero forjado; los engranajes grandes son de acero con coronas de aleación de acero. Los conductores intermedios son del tipo Farrel patentado de banda de caucho. En este caso, estos conductores fueron pedidos por la South Porto Rico como resultado del buen funcionamiento de conductores intermedios del mismo tipo en otros tándems de molinos en años recientes. Su construcción integral hace que se puedan remover en una sola pieza.

Cada conductor incluye un rodillo alimentador que hace que la maza cañera reciba un colchón de caña uniformemente compreso. El canalón de alimentación al primer molino tiene un rodillo alimentador inferior y otro superior para asegurar alimentación positiva. En cada caso, estos rodillos y los conductores con sus rodillos alimentadores son accionados desde la maza cañera por un embrague tipo Wichita neumático.

Como podrá verse en la ilustración inserta, el tablero central de mandos está dispuesto de modo que el operador pueda ver todo el tándem. La operación de los embragues de aire y la regulación de la velocidad de los molinos se realizan desde este punto.

Las bandejas de jugo son del tipo Everdur en doble V provistas de bombas inobstruibles para la circulación de la maceración y tamices Link-Belt vibratorios para colar el jugo final.

Delante del tándem se instalaron dos juegos de cuchillas de caña Farrel tipo K-4, las cuchillas del primero dispuestas a dos pulgadas de distancia y las del segundo a tres cuartos de pulgada de distancia. Cada juego es accionado por un motor de 600 c.f. y 600 r.p.m.

El nuevo tándem incluye los siguientes detalles de construcción usuales, con ciertas modificaciones: Armazones o vírgenes de una pieza; cierre de las tapas superiores con fuertes pasadores; tapas laterales engoznadas que se bajan para formar plataformas usadas para sacar las mazas laterales verticalmente; cojinetes de rodillos tipo de escala que van instalados entre la chumacera superior y la armazón en el lado de entrada de la caña para evitar aprisionamientos; placas de presión para dar mayor holgura al movimiento vertical y autoalineamiento sin aprisionamiento; arietes hidráulicos mejorados en combinación con acumuladores Edwards; y lubricación automática de todas las chumaceras y cojinetes de los molinos desde la estación central de mandos sobre el tándem.

TRACTOR ALLIS-CHALMERS HD-6 con

BARRA PORTAHERRAMIENTAS INTEGRAL

La potencia y tracción de los tractores de carriles se utiliza con mayor facilidad y eficacia cuando los implementos van instalados integralmente en el propio tractor.

Precisamente este es el caso en el tractor diesel Allis-Chalmers Modelo HD-6 provisto de la nueva barra portaherramientas integral, para servicio pesado, que sirve para la instalación de una diversidad de implementos—subsoladores, desfondadores, herramientas para labores de riego, zanjadoras, etc.

Estos implementos se alzan y bajan por mecanismo hidráulico, y se enganchan y desenganchan fácil y rápidamente de la barra portaherramientas. Además, la barra y los implementos se pueden desmontar en conjunto del tractor, y volver a instalarse cuando se los necesite nuevamente.

En la barra pueden usarse ruedas reguladoras de la profundidad (como equipo opcional) para regular con exactitud la penetración de los implementos. Barra e implementos son de fuerte construcción para que puedan resistir el trabajo más arduo.

Además de las faenas de labranza, el HD-6 se emplea extensamente en cañaverales para remolcar carretas de caña, para trabajos de nivelación, construcción y conservación de caminos, y para muchos otros fines, todo lo cual permite reducir los costos de funcionamiento y obtener mejores lucros.

Para obtener datos completos sobre el tractor HD-6 con barra portaherramientas e implementos, comuníquese con el distribuidor de maquinaria agrícola Allis-Chalmers en su región.

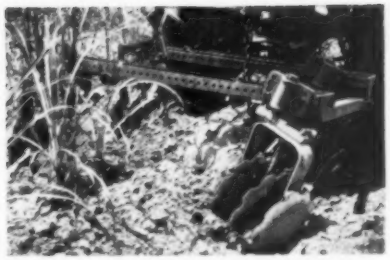
ALLIS-CHALMERS INTERNATIONAL
DEPARTAMENTO AZ358, MILWAUKEE 1, E.U.A.

FABRICANTES DE MAQUINARIA
DESDE 1847

ALLIS-CHALMERS

IMPLEMENTOS THOMSON

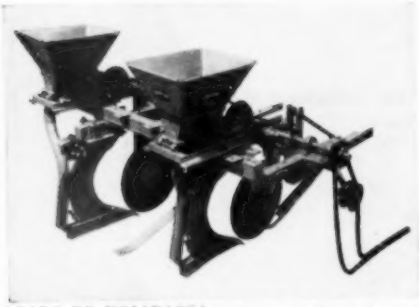
Expresamente Diseñados para Caña de Azúcar



CULTIVADORA DE DISCOS DOBLES—los grupos de discos se adaptan a las barras portaherramientas delanteras así como las traseras. Se pueden disponer para cultivar cualquier clase de siembra en surcos. Las cuchillas entalladas de servicio pesado tienen 20 pulgadas de diámetro.

Tractor UC Diesel tirando un arado pesado de 3 grupos de discos.

CULTIVADORA A DOS SURCOS—ajustable al ancho de surco y clase de laboreo que se deseen. La barra portaherramientas está diseñada para labores de alto despejo.



ARADO DE HOJARASCA—labora y abona sin perturbar la capa de hojarasca. Los cuerpos se pueden disponer con puntas subsoladoras, rejas de 10 pulgadas, o roturadores de surcos de 14 pulgadas.

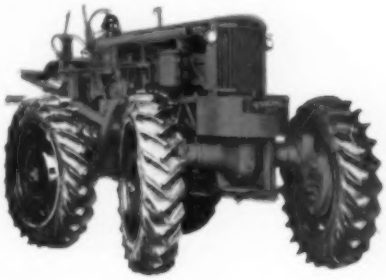
Gran Resistencia—cualidad inherente de los robustos Implementos Thomson para Caña de Azúcar y de la Barra Universal Portaherramientas para Tractores UC Diesel y de Cuatro Ruedas Motrices. Esta barra está construída para manejar y levantar implementos con un peso hasta una tonelada.

Alto Despejo—una característica de las barras portaherramientas e implementos de servicio pesado para roturar y laborear la tierra, y abonar y cultivar las cosechas. Este equipo iguala en potencia y despejo a los Tractores Thomson para Caña.

Extensa Diversidad de Ajustes—que permiten adaptar las robustas herramientas Thomson a cualquier labor de cañaveral. La Barra Universal Portaherramientas se adapta para el montaje de muchas herramientas y combinaciones de herramientas. Ha sido prácticamente probada con buenos resultados en casi todas las principales regiones productoras de caña en el mundo.

SOLICITE MAS INFORMACION Y FOLLETOS DESCRIPTIVOS

Tractor XTD de Cuatro Ruedas Motrices



THOMSON
MACHINERY CO., INC.
THIBODAUX, LA., U. S. A.

Una respuesta a las preocupaciones de los refinadores!

NORIT anuncia un nuevo modo económico de aplicación.

Los refinadores de azúcar que emplean ácido fosfórico y cal en clarificadores continuos para reducir los costos de carbón activado pueden **economizar como un 25% más** en carbón por el uso de NORIT, según el **método recientemente desarrollado,** para el cual ya se ha solicitado patente.

NORIT

Escríbannos en solicitud de datos completos!

UNITED NORIT SALES CORPORATION LTD. - AMSTERDAM - HOLLAND
AMERICAN NORIT COMPANY, INC. - JACKSONVILLE 8 - FLORIDA

Cargadora de caña Bucyrus-Erie 22-B de trabajo pesado en servicio en un terreno pendiente en Hawaii.

CARGADORAS DE CAÑA BUCYRUS-ERIE 22-B . . .

. . . FACILITAN LA COLOCACION DE LA CARGA

El descenso del izador es regulado mecánicamente, cuya operación es independiente de todas las demás funciones.

El ángulo del botalón se puede cambiar en cualquier punto del ciclo para situar la carga rápidamente y con precisión.

. . . RAPIDO MOVIMIENTO ENTRE CAMPOS

Los carriles tipo de tractor le dan mayor despejo o altura sobre el terreno, y sus garras profundas facilitan la tracción en terrenos pendientes y resbalosos.

La combinación de los carriles tipo de tractor y la rápida propulsión le dan óptima movilidad.

. . . REDUCEN EL TIEMPO DE CARGA

El tensor automático en el cable de suspensión hace el manejo del arpeo uniforme y seguro.

La gran velocidad de los cables y de viraje reduce el tiempo de carga.

. . . PROLONGAN LOS PERIODOS DE TRABAJO

Todos los engranajes en el bastidor giratorio (menos la cremallera y piñón) están completamente encerrados y son lubricados automáticamente por una corriente de aceite continua.

Cuanto menos tiempo se invierte en conservación más se prolongan los periodos de trabajo.

Estos son solamente unos cuantos de los distintivos que hacen la cargadora de caña 22-B de servicio pesado una máquina notable para la industria azucarera. Solicite datos completos sobre esta cargadora rápida de servicio pesado de nuestro distribuidor en su comarca o escríbanos directamente.

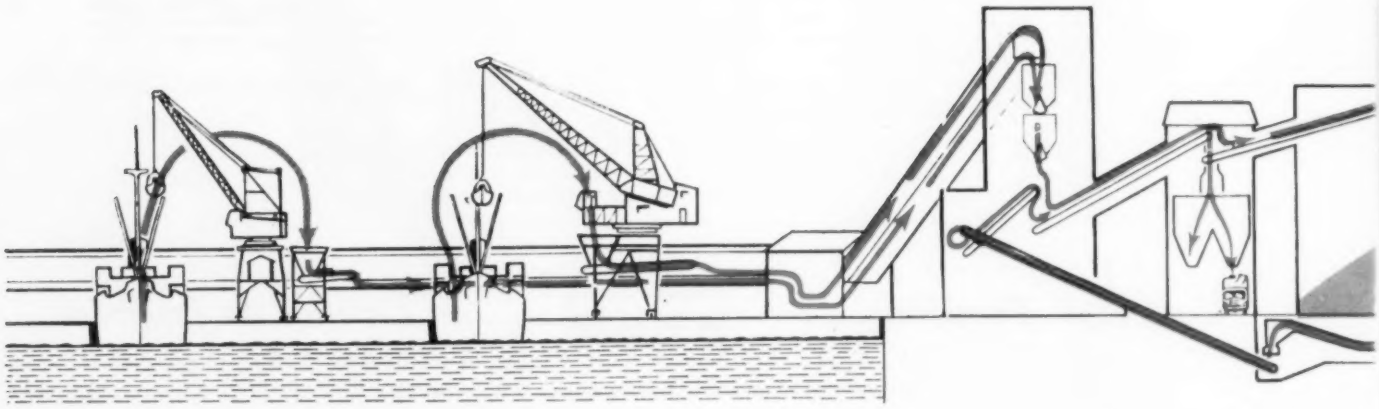
579E58

Un Rótulo Familiar . . . BUCYRUS ERIE ***. . . en Escenas de Progreso***

BUCYRUS-ERIE COMPANY, SOUTH MILWAUKEE, WISCONSIN, E.U.A.

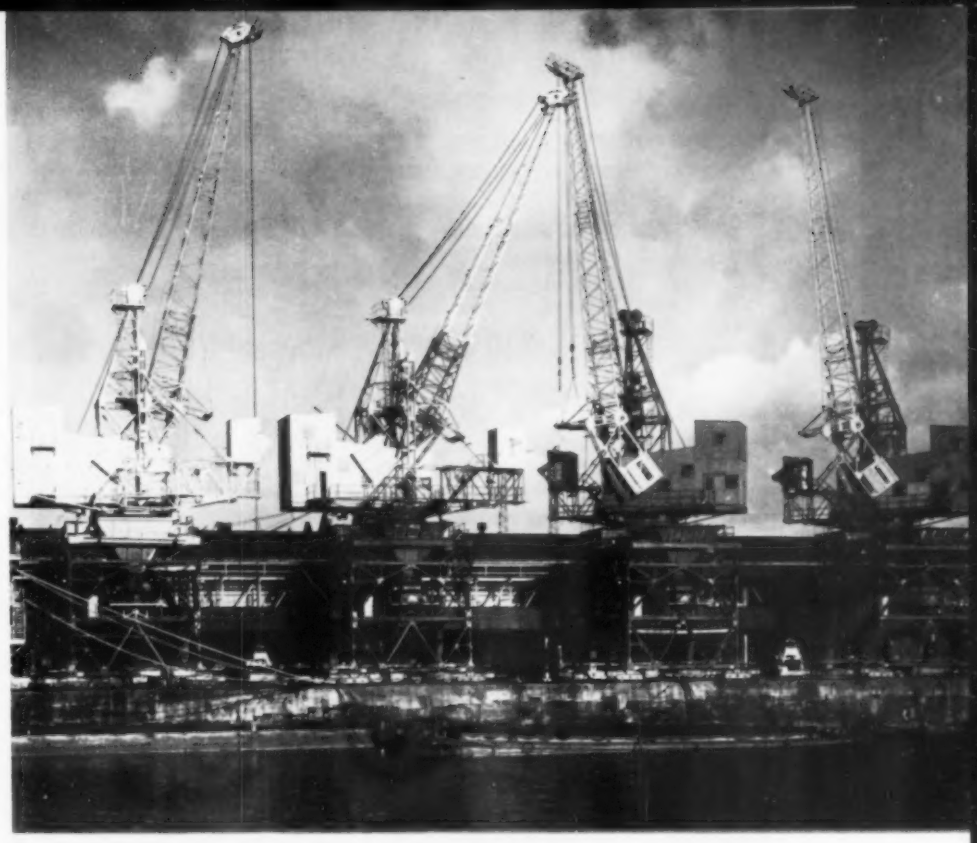
Sistema de Manejo a Granel de Tate & Lyle en Liverpool

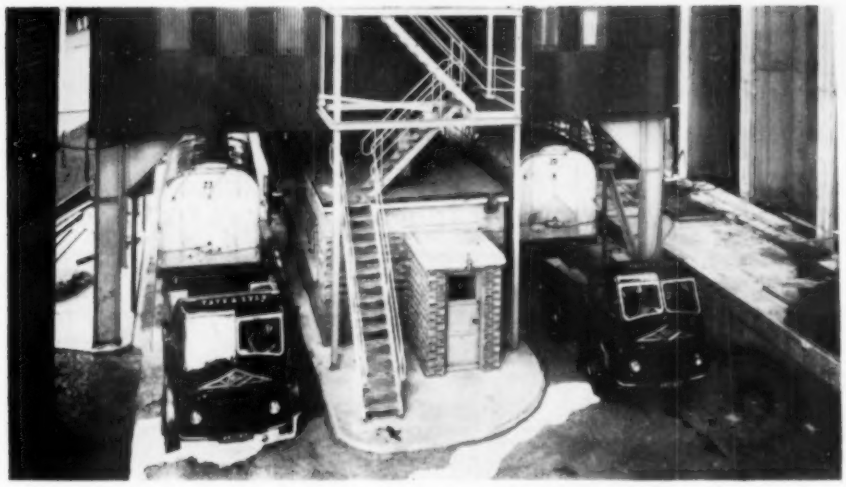
El Sistema de Descarga Más Rápido en el Mundo



El proyecto en los muelles de Huskisson recientemente terminado por Tate & Lyle en Liverpool, Inglaterra, e ilustrado en estas páginas, provee facilidades modernas para la descarga de azúcar crudo recibido en los muelles a granel, para su almacenamiento en un almacén de 100,000 toneladas de capacidad, y para su entrega a la refinería en vehículos especiales. Parte del equipo de descarga se encuentra en servicio desde 1952; las recientes mejoras han elevado en alto grado la rapidez y comodidad de descarga.

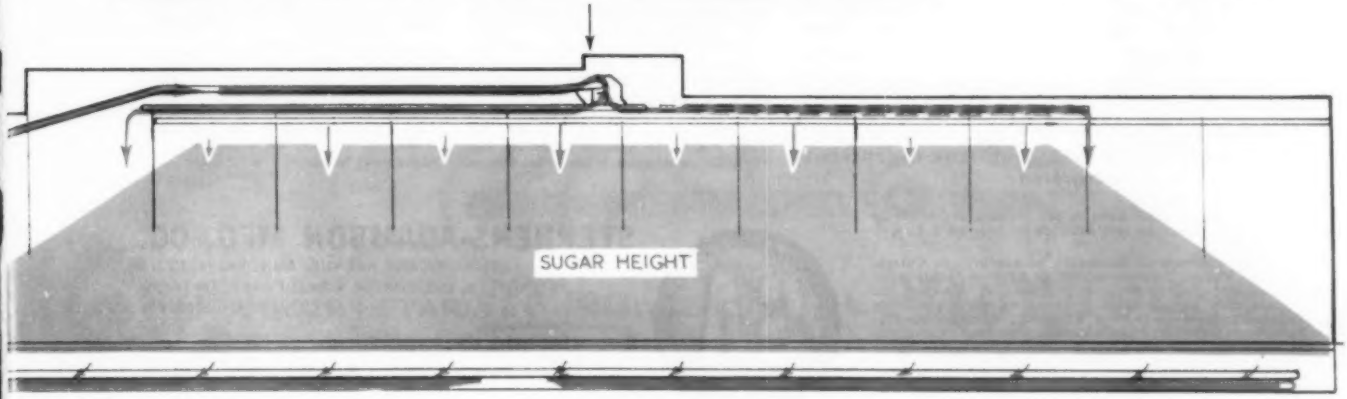
Los muelles pueden acomodar buques hasta 10,000 toneladas y el azúcar será recibido en buques especialmente dispuestos para el transporte de azúcar a granel así como en buques de tipo ordinario que pueden portar azúcar a granel. Además de las cuatro grúas de muelle en servicio desde 1952 se instalaron cuatro grúas nuevas tipo "canguro", como pueden verse arriba a la derecha. Estas grúas están provistas de arpeos de cinco toneladas con tolvas integrales en el frente de las máquinas, lo que elimina la necesidad de virarlas, y simplifica y acelera su operación. Las cuatro grúas existentes tenían una capacidad de 340 toneladas por hora; las grúas nuevas tienen una capacidad de 600 toneladas por hora. El sistema de conductores, como se indica en el diagrama simplificado en la página 58-59, ha sido diseñado para mantener cada cargamento separado hasta que sea pesado y analizado.



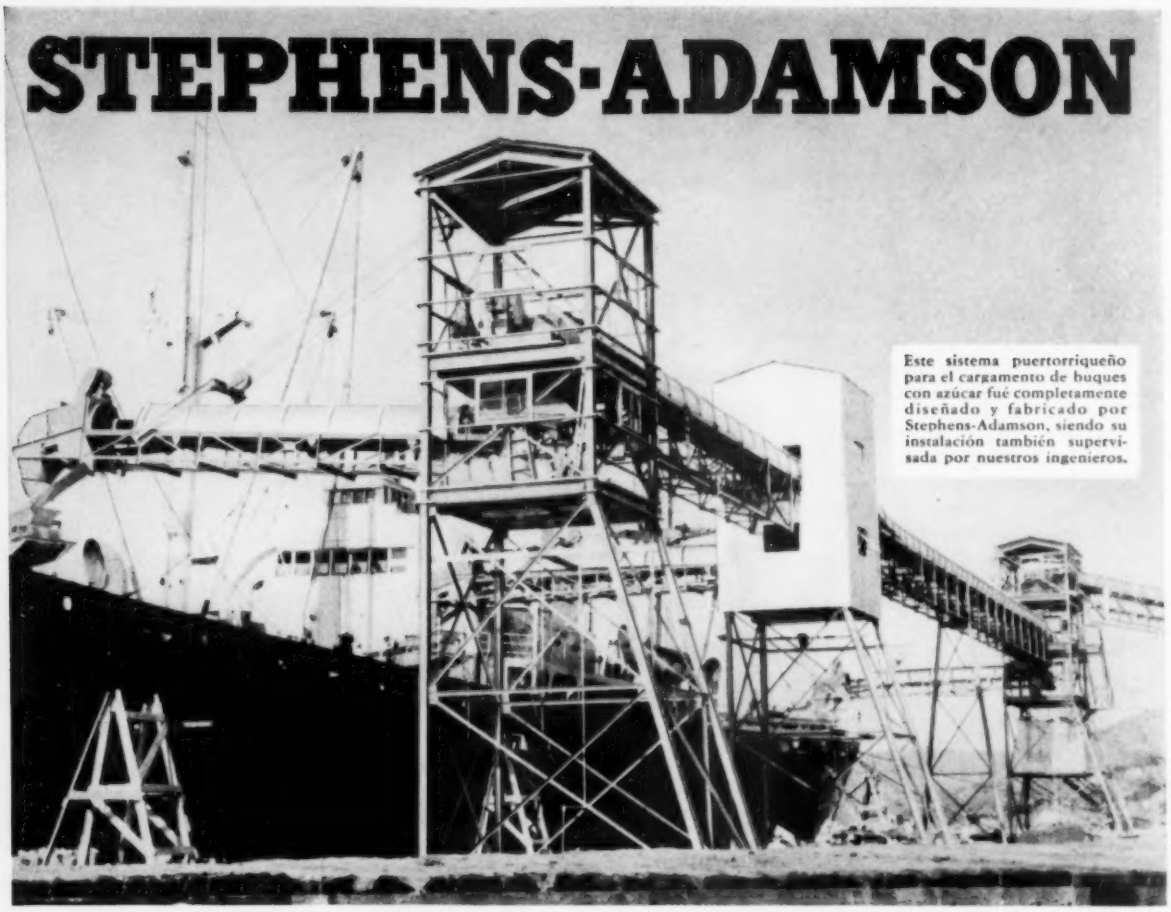


Los cargamentos de azúcar son conducidos desde el muelle y entregados individualmente a la estación de básculas, donde se vacían en una de tres básculas tipo Servo Balans, cada una de las cuales es capaz de pesar 400 toneladas de azúcar crudo por hora en partidas de 15,000 libras. La determinación del precio, la calidad, el análises, el cálculo de derechos y otros datos tienen su origen en este punto. Los mandos y cuadrantes de las básculas se encuentran en una sala inde-

(Sigue en la página 72)



STEPHENS-ADAMSON



Este sistema puertorriqueño para el cargamento de buques con azúcar fué completamente diseñado y fabricado por Stephens-Adamson, siendo su instalación también supervisada por nuestros ingenieros.

transporte de carga en volumen por hombres que conocen mejor el transporte

La economía de tiempo "en el puerto" por el buque significa un movimiento más rápido de las cargas desde y hasta las zonas de almacenaje y carga, con un esfuerzo manual tan reducido como es posible.

Los ingenieros de la STEPHENS-ADAMSON han desarrollado un amplio ranglón de equipo para el manejo de materiales en grandes volúmenes que hace precisamente esto. Y saben cómo aplicarlo para asegurar un movimiento de la carga al costo más bajo por tonelada. Los sistemas transportadores abarcan desde el más pequeño hasta caballetes móviles gigantes para la carga de buques.

Si el tráfico del puerto está recargando sus facilidades, es hora de que se ocupe de encontrar formas de acelerar el movimiento de carga en grandes volúmenes. Nuestros ingenieros gustosamente le asesorarán.

Grandes caballetes móviles gemelos con las patas de descarga en posición para descargar el buque. Se reduce grandemente el tiempo que éste permanece en el puerto; las operaciones manuales se mantienen al mínimo. Este equipo trabajará con cualquier material a granel: granular, pulverizado, en escamas, o pequeños trozos.

En un puerto del Pacífico, este equipo para la carga de buques maneja aproximadamente 350 THP de coque calcinado. Una canaleta telescópica que se asegura al aguilón del transportador, está provista de un arrumador que lanza el material a todos los rincones de la bodega del buque.

S-A fabrica una amplia gama de equipo para el manejo de materiales a granel en tres grandes fábricas en E.U.A. y el Canadá.

Transportadores de Correa; Alimentadores de Correa, Artesas y Placas; Transportadores de Aguilón para la carga de Buques; Transportadores Apiladores; Sistemas de Almacenaje y Recuperación; Transportadores Vibradores; Transportadores-Elevadores REDLER; Transportadores-Elevadores ZIPPER; Limpiadores de Correas; Dispositivos de Retenida; Cribones y Cribas; Apiladores Centrífugos; Compuertas para Tolvas y Túneles; Tiradores y Situadores de Vagones; Elevadores de Cangilones; Montacargas de Cajón; Conjuntos de Cojinetes de Bolas SEALMASTER.

Folleto descriptivo de cualquier equipo, a solicitud

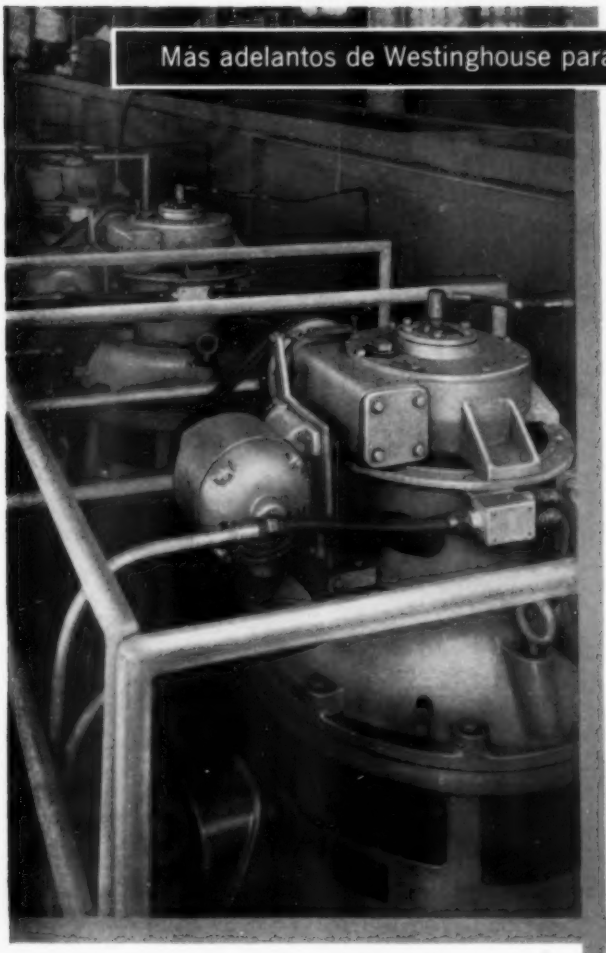
SINCE 1901 S-A STEPHENS-ADAMSON MFG. CO.

STEPHENS-ADAMSON MFG. CO.
121 RIDGEWAY AVENUE, AURORA, ILLINOIS
LOS ANGELES, CALIFORNIA • BELLEVILLE, ONTARIO
CLARKSDALE, MISSISSIPPI

Departmento de Exportación
121 Ridgeway Avenue, Aurora, Ill., E. U. A.

PROYECTISTAS • INGENIEROS • FABRICANTES

Más adelantos de Westinghouse para la industria azucarera



El extintor de arco De-ion da mayor seguridad para el control de las centrífugas

Para evitar posibles dificultades en el funcionamiento de las centrífugas, es imperativo especificar controles apropiados. Muy a menudo, si los controles no proveen acción rápida y segura en el arranque y el frenaje, pueden causar daño a los motores, costosas fallas y pérdida de producción.

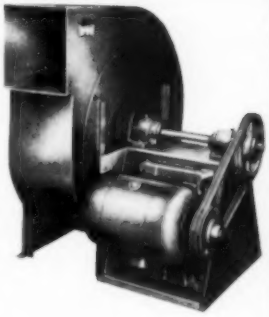
Los controles Westinghouse son mundialmente famosos en la industria azucarera porque han demostrado en servicio la eficacia de su diseño y la seguridad constante de su funcionamiento. El exclusivo extintor de arco De-ion es una de sus más notables ventajas. Otras son sus contactos de plata a plata, armaduras a prueba de atascamiento y su protección contra sobrecargas.

Estas ventajas serán suyas, también, cuando emplee controles Westinghouse en otras aplicaciones. Tanto en la instalación de nuevas centrífugas como al reemplazar un motor de ventilador, asegúrese de especificar Westinghouse . . . para obtener máxima protección.

Si desea información adicional sobre estos adelantos o ayuda en problemas técnicos específicos, escriba a: Westinghouse, Box 345, Wall Street Station, Nueva York 5, E.U.A.

Haga que el aire le ayude

No hay duda que un ventilador industrial Westinghouse podrá ayudarle a ejecutar más eficazmente por lo menos una tarea. Algunos de los trabajos que pueden encomendarse a estos ventiladores son: llevar el bagazo a los hornos o pilas de desperdicios, desecar el guarapo, o suministrar tiro forzado para las calderas de vapor. ¡Construcción para servicio fuerte! ¡Alta eficiencia! ¡Bajo costo de funcionamiento! Podemos suministrar tipos especiales para mover aire, polvo, astillas, azúcar, briznas, estopa y otros materiales. Escriba solicitando el folleto 8-C (en inglés).



Unidades eléctricas eficientes para todas las aplicaciones de calor

No importa cuál sea su problema—la calefacción de un laboratorio o el empleo de calor para un proceso de fabricación — Westinghouse puede suministrarle la unidad calentadora más a propiada para cada caso. El surtido completo de equipo de calefacción Westinghouse, eficaz y económico, se adapta a todas las aplicaciones posibles. Cada unidad, al igual que el calentador Corox para conductos de aire forzado que aquí se ve, puede obtenerse en diseño y capacidad especiales. Pida el folleto 8-D (en inglés.)

PUEDE ESTAR SEGURO... SI ES Westinghouse

Maneja mayor tonelaje debido a su . . .

- ***Menor radio de viraje***
- ***Cubo más grande (½ metro cúbico)***
- ***Amortiguador de carga hidráulico***
- ***Cubo inclinable 40° hacia atrás al nivel del suelo***
- ***Manejo del cubo por una sola palanca***

Cuando tenga que descargar grandes cantidades de azúcar u otros materiales a granel de vagones de ferrocarril o manejarlos en espacios reducidos, usted necesita un "PAYLOADER" Modelo HA.

Los dueños que vienen usando los tractores provistos de pala desde hace muchos años dicen que el Modelo HA, por su menor radio de viraje y capacidad de porte de una tonelada, es lo mejor en espacios reducidos—es rápido y fácil de manejar cargado o vacío—levanta cargas completas rápidamente y las entrega a velocidades hasta 10 m.p.h. con seguridad . . . gracias al amortiguador de carga hidráulico que reduce el sacudimiento y los derrames.

Para mayor rendimiento, el "PAYLOADER" se ofrece en tamaños mayores, hasta los modelos grandes de 4 ruedas motrices con capacidad de porte de 9,000 libras. El distribuidor del "PAYLOADER" puede darle información completa. Nuestro representante en el extranjero es el Distribuidor de Equipo de Construcción de la International Harvester Export Company.

THE FRANK G. HOUGH COMPANY
881 Sunnyside Ave., Libertyville, Ill., E.U.A.

Sírvanse enviarme información sobre el "PAYLOADER", como sigue:

☐ Modelo HA (cap. de porte 2,000 ℔) y Modelo HAH (cap. de porte 3,000 ℔).

☐ Modelos más grandes (cap. de porte 9,000 ℔).

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3-A-15

Equipo Moderno para Manejo de Materiales

THE FRANK G. HOUGH CO.

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

SAY "HUFF"

Central de azúcar en Chiclayo, Perú.

Insista en el equipo especial Worthington para la industria azucarera!

Generadores de turbina a vapor: Respaldados por más de 40 años de experiencia, los generadores de turbina a vapor Worthington están continuamente demostrando su alta eficiencia, seguridad y economía. Todas las turbinas Worthington son del fuerte tipo de impulsión, y turbinas y generadores satisfacen las elevadas normas de construcción de la NAEM. Los tamaños standard obtenibles son hasta de 12.500 kv, pudiéndose diseñar una turbina especial para cualquier combinación de admisión, extracción y escape de vapor propios de las centrales de azúcar.

Turbinas de impulsión para centrales: La moderna turbina Worthington para centrales de azúcar es también el resultado de 40 años de experiencia en el ramo. Desde su introducción en la industria, estas nuevas turbinas se han hecho muy populares, y están actualmente revolucionando el proceso de la trituración de la caña. De etapa única y de etapas múltiples, cada turbina provee un excelente medio de propulsión mecánica y muchos años de servicio sin contratiempos.

GRATIS! Un cuadro desplegable a dos colores conteniendo una serie de aplicaciones típicas del equipo Worthington para centrales azucareras le será remitido prontamente, a solicitud. Escriba pidiendo un ejemplar, o mayores informes sobre el equipo Worthington para centrales azucareras, a — Worthington Corporation, Departamento O. C., Harrison, N. J., U. S. A.

(T57-15)

WORTHINGTON

El símbolo de calidad en todo el mundo

Subsidiarias Worthington en la América Latina

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Worthington Limitada, Bogotá

MEXICO
Worthington de México, S.A., México, D.F.

Distribuidores de Maquinaria Especial

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En el pasado, el bagazo era retirado de la desmenuzadora manualmente y cargado en carretas de bueyes. De en cuadro hecho en 1880. Cortesía de The Bettman Archive.

HOY DIA . . . el azúcar se produce por métodos modernos

El carbón Darco® es el método moderno de refinar.

Si desea obtener una copia del cuadro ilustrado, propio para montar en marco, diríjase a la Atlas hoy mismo.

DARCO

MARCA REGISTRADA

ATLAS

DIVISIÓN DE PRODUCTOS QUÍMICOS

ATLAS POWDER COMPANY

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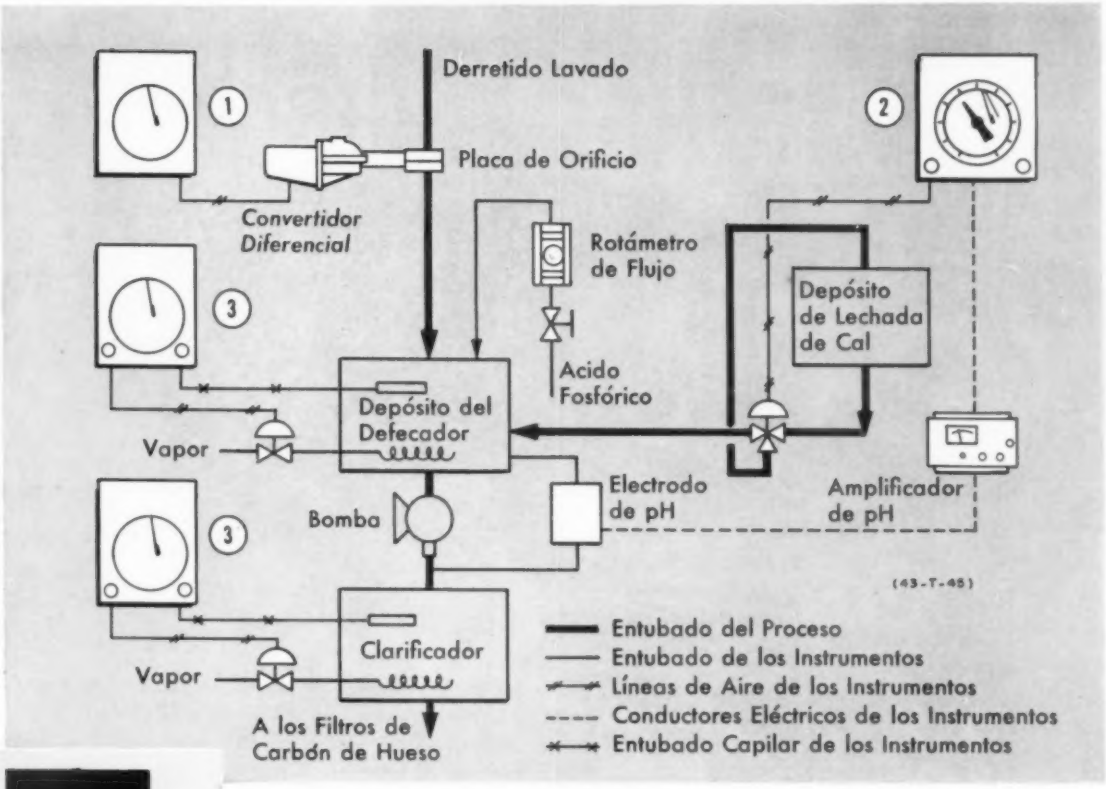
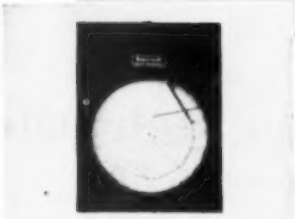


Los instrumentos Honeywell regulan un proceso de defecación por ácido fosfórico y cal.



(1) Medidor de Flujo.—Mide el flujo de derretido lavado.

(2) Regulador de pH.—Mide el pH del licor y regula la adición de lechada de cal para mantener el pH a un valor constante.

(3) Reguladores de Temperatura.—Regulan la temperatura en los depósitos del defecador y del clarificador.

Regulación automática de la defecación de derretidos

con instrumentos Honeywell

Obsérvese cómo los instrumentos Honeywell se aplican a un proceso típico de defecación de derretidos para regular el flujo, la temperatura y el pH. Estos reguladores automáticos precisos hacen que el proceso sea continuo... mantienen óptima calidad y rendimiento, y reducen los costos.

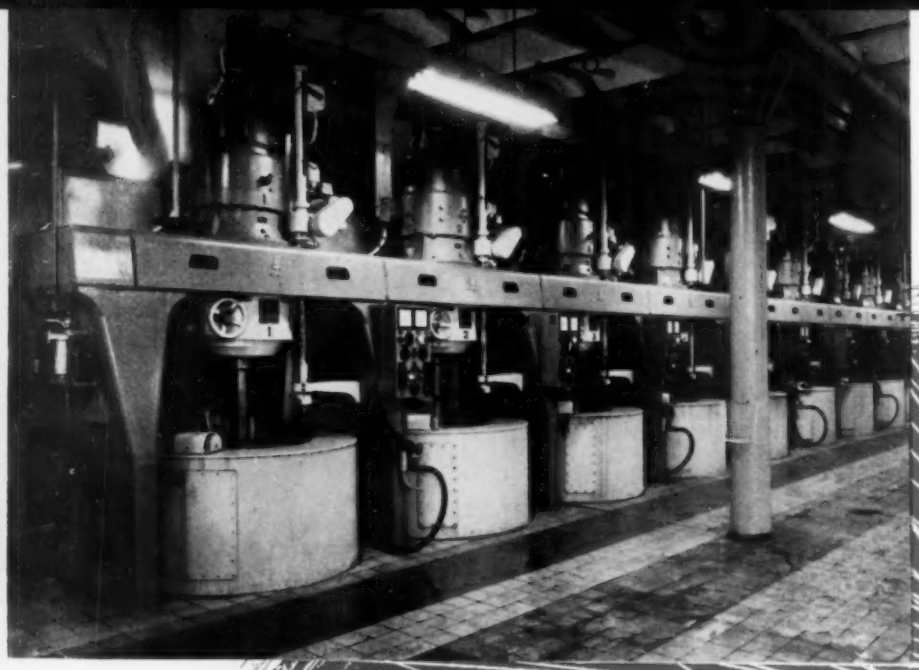
Estos reguladores automáticos pueden funcionar con mucha más precisión, rapidez y seguridad que los reguladores manuales aunque sean manejados por los operadores más expertos. Los instrumentos Honeywell producen grandes beneficios cuando se aplican a la afinación, cristalización y muchas otras fases del proceso de refinación.

El experto de Honeywell en su territorio le puede prestar valiosa ayuda en la instalación de estos instrumentos en su refinería. Comuníquese con él cuanto antes.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa., E.U.A.

Honeywell

H HONEYWELL *First in Controls*



En ingenios y refinerías de azúcar de remolacha y caña, se observa siempre la tendencia a modificar los procesos de manera de obtener mayor continuidad. Para llevar aún más adelante esta evolución, ASEA-Landsverk presentan

La Centrífuga Totalmente Automática

con accionamiento Leonard

Esta centrífuga presenta las mismas ventajas que la máquina de marcha continua y velocidad constante, en lo que se refiere a reducido consumo de energía y bajo costo de mantenimiento.

Las principales características de esta nueva centrífuga son:

Diseño aerodinámico

Velocidades variables, tanto máxima como de carga

Frenado regenerativo totalmente eléctrico

No se producen picos de carga

Mecanismo de carga con accionamiento neumático

Descargador accionado por motor eléctrico

Sincronización automática centralizada

Apta para todo tipo de azúcar

Contamos con representantes y organización de servicio [illegible] en casi todos los países productores de azúcar.

Para mayor información, diríjase a la oficina de ASEA más próxima, o directamente a

ASEA

Västerås, Suecia

AUNQUE los sacos llevan el mismo nombre de muchos años atrás, los auxiliares filtrantes Dicalite no son iguales—pues han sido mejorados continuamente. Probablemente usted podrá convencerse de ello examinando sus informes de filtración, digamos de los últimos diez años; creemos que en condiciones similares usted observará que ahora los materiales Dicalite están produciendo mayor rendimiento por libra de material filtrante, ciclos más largos, y tal vez mayor claridad.

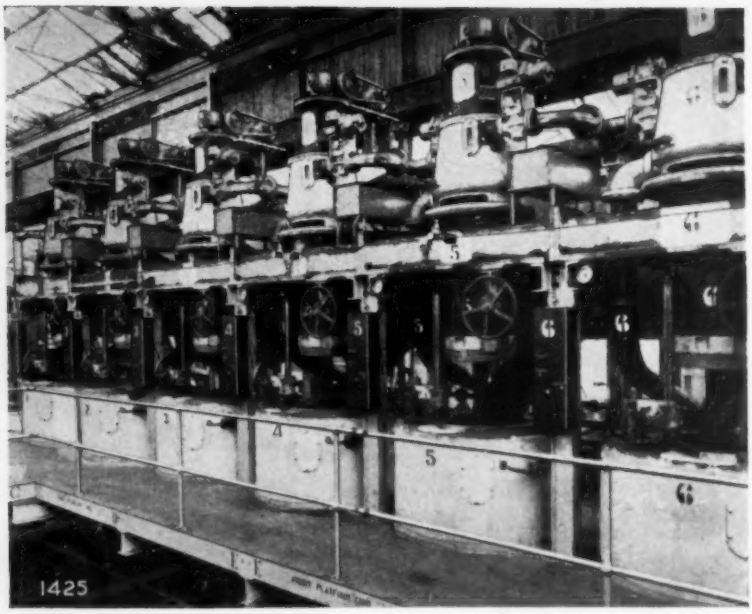
Esta cualidad mejorada de los auxiliares filtrantes Dicalite es el resultado de los incansables esfuerzos de nuestros laboratorios y personal técnico. Nada extraordinario—una ligera mejora aquí, un pequeño avance allí, un pequeño perfeccionamiento en otra etapa en la preparación de los productos Dicalite, en fin múltiples pequeños refinamientos que suman un total considerable e empresivo. Estas mejoras se reflejan diariamente en su propio proceso de filtración . . . y ofrecen prueba final de que

No Hay Mejores Auxiliares Filtrantes de Diatomita que los producidos por . . .

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DICALITE DEPARTMENT

GREAT LAKES CARBON CORPORATION • 612 SOUTH FLOWER STREET, LOS ANGELES 17, CALIF.



CENTRIFUGAS

Movidas

Por Agua

Esta batería de centrífugas semiautomáticas movidas por agua funciona a una velocidad óptima de 1500 r.p.m. Cada centrífuga está provista de un motor eléctrico auxiliar con caja de engranajes y embrague automático para darle una velocidad de descarga de 50 r.p.m. Estas centrífugas están provistas de frenos enfriados por agua, descargadores mecánicos, y válvulas de mezclador, canales de escurrimiento y válvulas de agua accionadas mecánimente. El lavado es automático. La batería viene completa con compresor de aire y precalentador de masacocida tipo Blanchard en el mezclador.

POTT, CASSELS & WILLIAMSON

MOTHERWELL - LANARKSHIRE - SCOTLAND

***Cable:* Pott: Motherwell**

P&W

Programa del 10° Congreso de Tecnólogos de Caña

El 10° Congreso de la Sociedad Internacional de Tecnólogos Azucareros de Caña se celebrará en Honolulu, Hawaii, del 3 al 22 de mayo de 1958 aproximadamente de acuerdo con el siguiente programa:

Mayo 3, domingo.—Llegada a Honolulu.

Mayo 4.—Registro de delegados y sesión inaugural.

Mayo 5, 6 y 7.—Los delegados de la sección agrícola visitarán la Estación Experimental de la H.S.P.A. y el Central Oahu. Los delegados de la sección fabril visitarán la misma Estación, el sistema de carga a granel de la Refinería Aiea, y el Central Oahu.

Del 8 al 17 de mayo los delegados de fábrica y los de campo visitarán en grupos separados las islas de Kauai, Maui y Hawaii.

Delegados de la Sección Agrícola:

Mayo 8.—Volarán a Maui. Visitarán la Hawaiian Commercial & Sugar Co. Por la tarde volarán a Kona, Hawaii.

Mayo 9.—Excursión por Kona.

Mayo 10, domingo.—Viaje por automóvil desde Kona hasta Hilo vía Casa del Volcán (Volcano House) para almorzar, y visita a los cráters.

Mayo 11.—Recurrido por centrales en la costa de Hilo, Hawaii.

Mayo 12.—Recorrido por centrales en la costa de Hamakua, Hawaii.

Mayo 13.—Recorrido por el central de la Olaa Sugar Co. por la mañana y vuelo a la isla de Kauai por la tarde.

Mayo 14 y 15.—Recorrido por centrales en Kauai.

Mayo 16.—Excursión por Kauai.

Mayo 17, domingo.—Excursión por Kauai por la mañana y vuelo a Honolulu por la tarde.

Delegados de la Sección Fabril:

Mayo 8.—Recorrido por centrales en Oahu.

Mayo 9.—Vuelo a la isla de Kauai y excursión.

Mayo 10, domingo.—Excursión por Kauai.

Mayo 11 y 12.—Recorrido por centrales en Kauai.

Mayo 13.—Vuelo a la isla de Maui por la mañana y visita a la central de la Hawaiian Commercial and Sugar Co., y visita a Hilo, Hawaii por la tarde.

Mayo 14 y 15.—Recorrido por centrales en Hawaii.

Mayo 16.—Viaje por autómovil de Hilo a Kona vía Casa del Volcán y excursión a los cráters.

Mayo 17, domingo.—Vuelo de Kona a Honolulu.

Mayo 18 al 22.—Sesiones del 10° Congreso reunido en la región de la playa de Waikiki en el salón de actos de uno de los principales hoteles.

Mayo 23.—Partida de los delegados.

Se calcula que el costo mínimo por delegado ascenderá a unos $500.00, más los costos de transporte a Hawaii y regreso. Esta cifra incluirá gastos de hotel, comidas, transporte aéreo entre islas, transporte local, recorridos por centrales, pero no excursiones especiales, que los delegados podrán hacer por su cuenta mediante previo arreglo.

■

Carta al Editor

Señor:

Sus lectores han demostrado gran interés en las reproducciones de escenas en fábricas de azúcar en años pasados que nosotros estamos ofreciendo en los anuncios publicados en su revista.

Lo cierto es que su interés es tan marcado que nos causa cierta preocupación, pues debido al alto número de solicitudes recibidas y a la pericia que la reproducción de estos cuadros implica, estamos muy atrasados en el cumplimientos de estos pedidos.

Si fuere posible, le agradeceríamos que hiciera saber a sus lectores lo mucho que lamentamos esta demora y les asegurase que sus pedidos serán cumplidos lo más pronto posible.

William T. Scott, Atlas Powder Company

Comisión Internacional Sobre Métodos de Análisis de Azúcar

La 12ª Sesión de la Comisión Internacional Sobre Métodos de Análisis de Azúcar se celebrará en el Negociado Nacional de Normas y en el Hotel Shoreham, Washington, D. C., E.U.A. del 2 al 5 de junio de 1958.

En Antillas Británicas se acaba de formar un Comité Nacional que eleva a quince el número de Comités afiliados, y se están formando otros nueve, por lo menos.

Los delegados no necesitan invitación formal, pero sus Comités Nacionales respectivos deben avisar al Secretario de la Comisión Internacional los nombres de los delegados elegidos para asistir a la Sesión.

Las personas que no representen un Comité Nacional, pero que desean asistir a la Sesión como observadores, deben comunicarse con el Secretario cuanto antes a fin de obtener aprobación formal para asistir.

No existen límites con respecto al país de origina ni a la importancia de la industria azucarera, pero el espacio reducido en los salones de actos hace necesario limitar el número de observadores admitidos. Tal como se anunció previamente, los delegados y observadores tendrán que hacer sus propios arreglos con respecto a su viaje y acomodaciones, y sugerimos que se ocupen de esto cuanto antes. Los interesados pueden obtener una lista de hoteles adecuados del Secretario, Dr. D. Gross, Laboratorios de Tate & Lyle, Keston, Kent, Inglaterra, o del Organizador, Sr. C. F. Snyder, Negociado Nacional de Normas, Washington, D. C., E.U.A.

Según información recibida, parece que asistirá un buen número de delegados y observadores de varios países europeos. El Congreso ofrecerá un punto de reunión y discusión para gran parte de los químicos y expertos azucareros más destacados del mundo, con un temario científico que supera aun el ambicioso programa de la 11ª y última Sesión celebrada en Paris en 1954, cuya Memoria todavía se puede obtener del Secretario o del Dr. H. B. Hass, Sugar Research Foundation, Inc., 52 Wall Street, New York 5, N.Y., E.U.A. (Precio £1.—o $3.00, porte pagado.)

El temario de esta Sesión incluye 29 temas, como sigue:

Título	*Ponente*	*País*
Constitución y reglamentos.	H.C.S. de Whalley	Inglaterra
Peso, tara, muestras y clasificación de azúcares.	A. E. Tate	Inglaterra
Conductometría y gravimetría.	K. Sandera	Checoeslovaquia
Determinación de azúcares reductores en productos de azúcar otros que melaza y azúcares refinos.	E. J. McDonald	E.U.A.
Pruebas de decoloración para carbón de hueso.	E. P. Barrett	U.S.A.
Sacarosa y azúcares reductores en melaza.	C. H. Allen	Inglaterra
Tablas de índices de refracción de soluciones de azúcar.	C. F. Snyder	E.U.A.
Placas reguladoras de cuarzo.	E. Einsporn	Alemania
Pruebas para la evaluación de las cualidades de refinación de azúcar de remolacha.	P. Devillers	Francia
Pruebas para la evaluación de las cualidades de refinación de azúcar de caña.	C. W. Davis	Australia
Especificaciones y tolerancia de sacarosa pura y reactivos.	J. Henry	Bélgica
Pruebas para la evaluación de las cualidades de cristalización de licores de refinería.	A. van Hook	E.U.A.
Color y turbidez de productos de azúcar y reflectancia de azúcares sólidos.	T. R. Gillett	E.U.A.
Valores del divisor de Clerget y métodos de múltiple polarización para sacarosa y rafinosa.	J. Dubourg	Francia
Substancia seca (sólidos totales) en productos de azúcar secos, índice de refracción y otros métodos.	S. D. Gardiner	Inglaterra
pH	D. Gross	Inglaterra
Análisis y evaluación de azúcares refinos.	C. P. Meade	E.U.A.
Diseño y normalización de aparatos de laboratorio.	J. Ancizar-Sordo	Colombia
Error de plomo en la polarización de azúcar crudo.	J. G. N. Gaskin	Inglaterra
Rafinosa y otros oligosacáridos y glicósidos.	A. Carruthers	Inglaterra
Determinación de azúcares en remolacha.	H. Hirschmuller	Alemania
Determinación de los factores causantes de la deterioración de azúcares crudos en depósitos y en tránsito.	M. E. C. Powers	Inglaterra
Componentes inorgánicos de azúcares y productos de azúcar.	R. Saunier	Francia
Productos de la hidrólisis de almidón.	K. Heyns	Alemania
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Valores microbiológicos en azúcares de caña crudos y refinos.	I. R. Sherwood	Australia
Valores microbiológicos en azúcares de remolacha crudos y refinos.	R. Weidenhagen	Alemania

Extractos de Publicaciones Azucareras

Publicados bajos los Auspicios de la Sociedad Internacional de Tecnólogos Azucareros de Caña por Arreglo Especial con SUGAR y AZUCAR—Dr. O. W. Willcox, Redactor Técnico

Tecnología

Agua Suavizada para Calderas de Alta Presión

C. ALLEN, *South African Sugar Journal*, Vol. 40, págs. 807-808 (1956).

En la refinería de Tate & Lyle en los muelles de Plaistow se instaló un evaporador de cuádruple efecto para evaporar agua de alimentación para dos calderas de alta presión. Para el caso, se emplea vapor rebajado de 650 a 251 lbs. presión/pulg. cuadrada alimentado al primer vaso del evaporador, donde pasa de un vaso a otro. El agua evaporada sale del último vaso a 70 lbs. y se utiliza para la generación de vapor para el proceso de elaboración. El resultado es que el condensado en la calandrias casi equivale a agua destilada, por lo que evita el peligro de incrustaciones que puedan menoscabar la transferencia de calor. La superficie metálica de las calderas se protege contra la corrosión extrayendo el gas oxigenado por un desaereador al vacío. Los últimos rastros de exígeno se eliminan por tratamiento con sulfito de sodio.

■

Manejo de Filtrados Turbios

T. LOWE, *Sugar Journal*, Vol. 19, No. 5, págs. 34-44 (1956).

El filtrado turbio procedente de los filtros Oliver es tratado con 50 libras de auxiliar filtrante 'Hy-Flow' por cada 5,000 galones, calentado a 150° F., alcalizado hasta pH 7.8 y pasado por un filtro 'Fas-Flo'. El filtrado brillante se envía a los evaporadores y la filtración se continúa hasta que la presión alcanza 40 lbs./pulgadas cuadradas. El jugo no filtrado es vaciado; el jugo residual y la torta son removidos por aire comprimido, y la última es descartada. El proceso de filtra-

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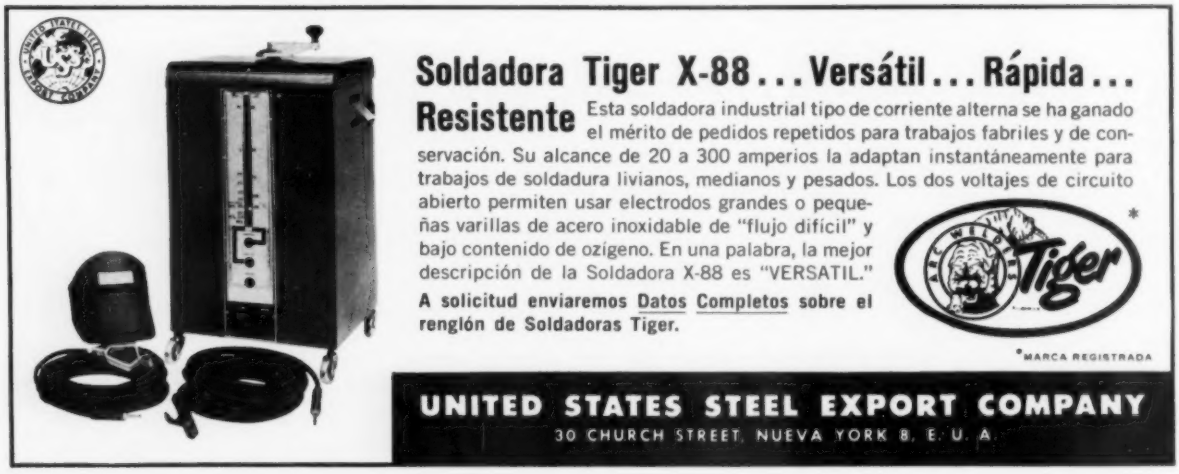

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ción lleva aproximadamente una hora, y la preparación para el próximo ciclo consume 45 minutos. La capacidad es de 9,000 a 12,000 galones cada 24 horas, y los costos de operación ascienden a unos $25 diarios.

Este filtro resulta de utilidad para vencer dificultades de clarificación en períodos de mal tiempo, cuando se entrega caña sucia y no es necesario devolver el filtro turbio al clarificador, con los consiguientes inconvenientes.

■

Operación Automática de Tachos en el Central Soledad

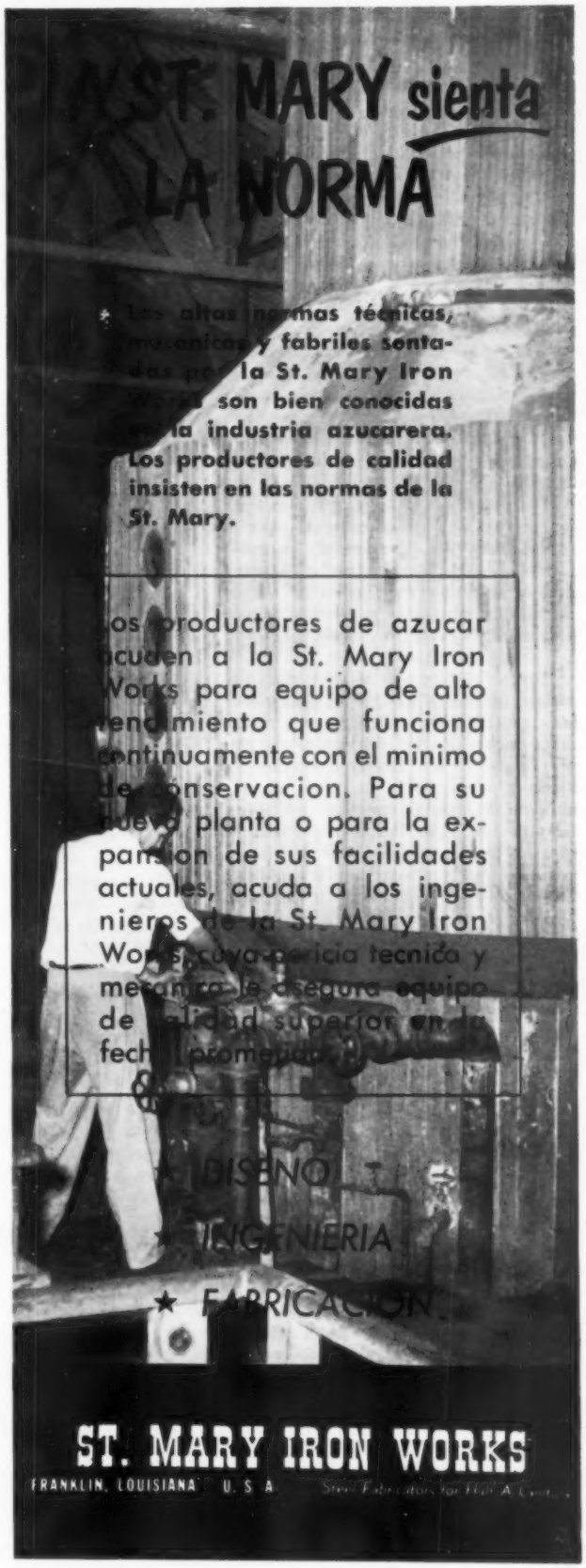
JOSE A. CLARK y ALBERTO A. CHISHOLM, *Sugar Journal*, Vol. 20, No. 3, págs. 60-61; 63-54 (1957).

El tacho está provisto de un registrador y regulador de sobresaturación, compuesto de dos bulbos de temperatura interconectados, uno en el tubo bajante del tacho para comprobar la temperatura de la solución de azúcar; el otro va insertado en un tacho experimental montado en el resalte superior del tacho y alimentado con un chorro continuo de agua hirviente. Este bulbo va colocado sobre el nivel de agua en ebullición en el tacho experimental, donde mide la temperatura de los vapores, la elevación del punto de ebullición y la pureza de la solución, y ofrece una lectura directa de la sobresaturación; además, acciona automáticamente los elementos de regulación en las distintas etapas del proceso de cocción. Esto da por resultado un control absoluto sobre el vacío dentro de 0.1" de mercurio. Esta presión absoluta hace funcionar neumáticamente una válvula en la línea de alimentación de agua el condensador, y, para conveniencia del operador de los tachos, expresa la presión en pulgadas de vacío.

Además de lo anterior, hay un sistema para regular la consistencia de la masa cocida, que consta de tres pequeños impulsores un poco más arriba de la calandria y movidos por un motor de medio caballo de fuerza y baja velocidad conectado a un transmisor neumático que da señales de acuerdo con las revoluciones del motor y la consistencia de la masa, y acciona la válvula de alimentación del tacho.

En la práctica, se alimenta la masa cocida al tacho, se eleva el vacío y se inyecta vapor a la calandria; el registro de pureza del regulador de sobresaturación se ajusta según la pureza de la masa, y la cocción procede bajo control a 26 pulgadas de mercurio. Cuando la sobresaturación llega a 1.30, el operador recibe una señal, en cuyo momento alimenta una pequeña cantidad de semilla al tacho. Cuando la sobresaturación llega a 1.40, una señal automática indica el momento para reducir la presión a 24"; entonces la sobresaturación disminuye, cesa la formación de nuevos cristales y los existences crecen rápidamente. Para mantener este desarrollo constante de los cristales y evitar la formación de gemelos y conglomerados, el regulador de la sobresaturación modera la continua alimentación de sirope hasta que el sistema de regulación de la consistencia se encarga de la alimentación y la velocidad de evaporación. Una vez establecido el ajuste del regulador de consistencia, es generalmente innecesario cambiarlo. Cuando la masa cocida llega al punto de descarga, el operador cierra la válvula de alimentación y la evaporación continúa hasta alcanzar el Brix deseado.

Las ventajas de este sistema, comparado con la regulación manual, estriban en que la operación se puede repetir, la calidad del azúcar es mejor, las operaciones en los tachos y las centrífugas son facilitadas y aceleradas, la pureza del cristal de azúcar es más alta, ocurre menos recirculación de las mieles, el número total de cochuras se reduce, las mieles se agotan más completamente, ye se obtiene mejor control del tamaño de los cristales de azúcar.



Filtros Sparkler

(Viene de la página 48)

nar el ciclo se realizó con jugo clarificado, lo que requiere unos 900 galones aproximadamente. Este jugo y la torta de filtro fueron devueltos al proceso de primera carbonatación por gravedad. Seguidamente, los filtros y las líneas fueron lavados con una pequeña cantidad de agua, se cambiaron las válvulas de purga, y los paños de los filtros fueron lavados con agua caliente. Esta última práctica contribuye en gran parte a mantener los paños limpios y en buenas condiciones filtrantes.

Se adoptó la práctica de cambiar y lavar los paños de los filtros todas las semanas. Para tal fin se compró un juego adicional de hojas de filtro. De este modo los paños de filtro se mantienen en tan buenas condiciones filtrantes como las de paños nuevos.

En ambas temporadas se usó tela de filtro designada Tipo 901 F Dynel, fabricada por la U. S. Rubber Company. Un juego de paños de *nylon* especialmente tratado al calor del mismo peso y tejido que los paños de *Dynel* fué usado con resultados igualmente buenos. Todos estos paños son hechos en la fábrica de azúcar en Betteravia con hilo de algodón ordinario satinado.

A la fecha, estos paños duran más de 100 como promedio. Durante las dos campañas se hicieron y usaron dos juegos y medio de paños para los filtros. Otro juego y medio se mantiene en reserva para uso el año que viene al cabo de 185 días de operación.

Durante la temporada de verano se probaron telas de alambre en uno de los filtros. Debido al hecho que para la precapa se emplean pequeñas cantidades de flóculos de *solka* mezclados con auxiliar filtrante, este filtro tuve que ser operado bajo un régimen de flujo constante para evitar la pérdida de torta. Para no tener que emplear amianto en lugar de los flóculos de *solka*, que ayudan en los trabajos de limpieza y acorta el período de la precapa, el uso de las telas de alambre fué abandonado en favor de los paños menos costosos. La tela de alambre probada tenía 60 x 60 hilos por pulgada cuadrada de acero inoxidable. No se registró dificultad alguna en cuanto a tupimiento durante el período de unos 60 días de prueba.

Resumen y Conclusiones

Los costos de operación para las campañas de 1956 y 1957 se indican en la Tabla 2. Un examen de los resultados revela una reducción de ochenta por ciento en el costo de paños de filtro y de cincuenta por ciento en el costo de trabajo por tonelada de remolacha. Combinados, estos resultados representan una reducción en los costos de 56 por ciento por tonelada de remolacha cuando se calculan en las mismas bases que los costos de trabajo.

El costo total de la instalación de los filtros ascendió a $8.436.36 por filtro, incluyendo los instrumentos de regulación, la tubería y la bomba adicional para fines de lavaje.

A base de las economías obtenidas el año pasado en la mano de obra y materiales, el costo de la nueva instalación podrá ser amortizado en poco más de seis años y medio. Cualquier aumento en los costos de operación y mano de obra reducirá el período de amortización.

Los resultados obtenidos indican que, en conjunto, el equipo e instrumentos de regulación instalados redujeron considerablemente los costos de trabajo y materiales sobre los filtros de placas y cuadros y a la vez elevaron en alto grado el factor de seguridad y eficiencia en la estación de filtros a una costo razonable.

■

Tate & Lyle

(Viene de la página 59)

pendiente. La sala de mandos incluye un sistema de comunicación con las grúas, el almacén, la estación de carga de los vehículos y otros puntos importantes.

Como podrá verse en el centro de esta página, la estación de carga de los vehículos consta de dos básculas de plataforma y una oficina. El azúcar crudo descargado de los buques pasa por la estación de básculas y luego a la estación de carga de los vehículos para su transbordo a la refinería, o puede continuar en el sistema de conductores hasta el almacén. Los pesos obtenidos en esta estación se deducen del peso total para determinar la cantidad de azúcar entregada al silo.

El silo o depósito es uno de los más grandes construídos hasta ahora. Es de forma parabólica, tal como se indica en la ilustración en la página opuesta; tiene 166 pies de ancho en la base, 86 pies de altura hasta el ápice y 543 pies de largo. Cómo podrá verse, el azúcar es descargado de los conductotores por el domo, se comprime contra las paredes del silo hasta las líneas negras en el interior y luego asume un ángulo normal de reposo.

El azúcar es devuelto a la estación de carga de los vehículos para su transbordo a la refinería por un conductor que corre todo el largo del depósito por un túnel en el centro del piso.

■

AZUCAR—Por Hubert Edson

(Viene de la página 49)

merosos incidentes, algunos chistosos; algunos trágicos o casi trágicos, pero todos de gran interés humano.

Sin duda, su libro ocupará un prominente lugar en la historia del azúcar de caña en el Hemisferio Occidental, especialmente en sus aspectos administrativos, cuya lectura será provechosa para todo joven que está cursando una carrera en esta industria.

Dr. O. W. Willcox

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